Atlas RTPS Packet Payload ICD

Checkout and Launch Control System (CLCS)

84K00351-002

Approval:

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NOTE: See "**Supporting Document Note**" on following page

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Supporting Document Note: Acronyms and definitions of many common CLCS terms may be found in the following documents: CLCS Acronyms 84K00240 and CLCS Project Glossary 84K00250.

REVISION HISTORY

REV	DESCRIPTION	DATE

LIST OF EFFECTIVE PAGES				
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Page No.	**A or D***	**Issue or Change No.**	**CR No.**	**Effective Date****

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ATLAS RTPS PACKET PAYLOAD ICD

CHECKOUT AND LAUNCH CONTROL SYSTEM (CLCS)

1. INTRODUCTION

1.1 SCOPE

This THOR RTPS Packet Payload Interface Control Document (ICD) defines the contents of packet payloads that are passed between processors of the Real-Time Processor Subsystem (RTPS) on the Real Time Critical Network (RTCN) and on the Display and Control Network (DCN) for the THOR release.. The RTPS is one of the systems that comprise the Checkout and Launch Control System (CLCS).

1.2 PURPOSE

This ICD is intended to serve as a reference document for systems programmers, as well as a baseline for software development. It will be used by RTPS (and CLCS simulation) programmers as a basis for the design, implementation, testing, and maintenance of the RTPS and any related systems that may evolve from this architecture.

1.3 RELATED DOCUMENTS

84K00200	CLCS System Level Specification	April 15, 1997
84K00210	CLCS System Design Document	April 24, 1997
SS-P-0002-140T	Space Shuttle Computer Program Development Specifications (CPDS) SS Downlist/Uplink Software Requirements	October, 1995
SS-P-0002-150N	Space Shuttle Computer Program Development Specifications SS LDB Software Interface Requirements	March, 1996

1.4 DOCUMENT OVERVIEW

This document is organized into 4 main sections. Section 1 contains the introduction to the document. Section 2, SYSTEM DATA PASSING PHILOSOPHY, introduces the packet payload (which carries the communication data between subsystems) and describes the format and content of the Packet Payload Headers and many of the Packet Payload Bodies. Also contained in Section 2 is a list of Gateway C-C Response Completion Codes and their meanings. Section 3, C-C/RESPONSE PACKET PAYLOAD BODIES describes the contents of the bodies for each C-C and each Response. Section 4, LOG DATA PACKET PAYLOAD BODIES describes the contents of the bodies for each Log Data ID.

1.5 DOCUMENT CONVENTIONS

During the late 1996 to early 1997 time frame several meetings were held in which the bit numbering standard for CLCS was discussed. Two different numbering schemes were discussed (shown below in figure 1.0) named Shuttle Standard and CLCS Packet Payload ICD or COTS Standard. In the next to final meeting the CLCS Packet Payload ICD bit numbering scheme was selected and then the decision was reversed and the Shuttle Standard was adopted. The final decision was not adequately communicated across the project and the Packet Payload ICD was developed and released using the CLCS Packet Payload standard.

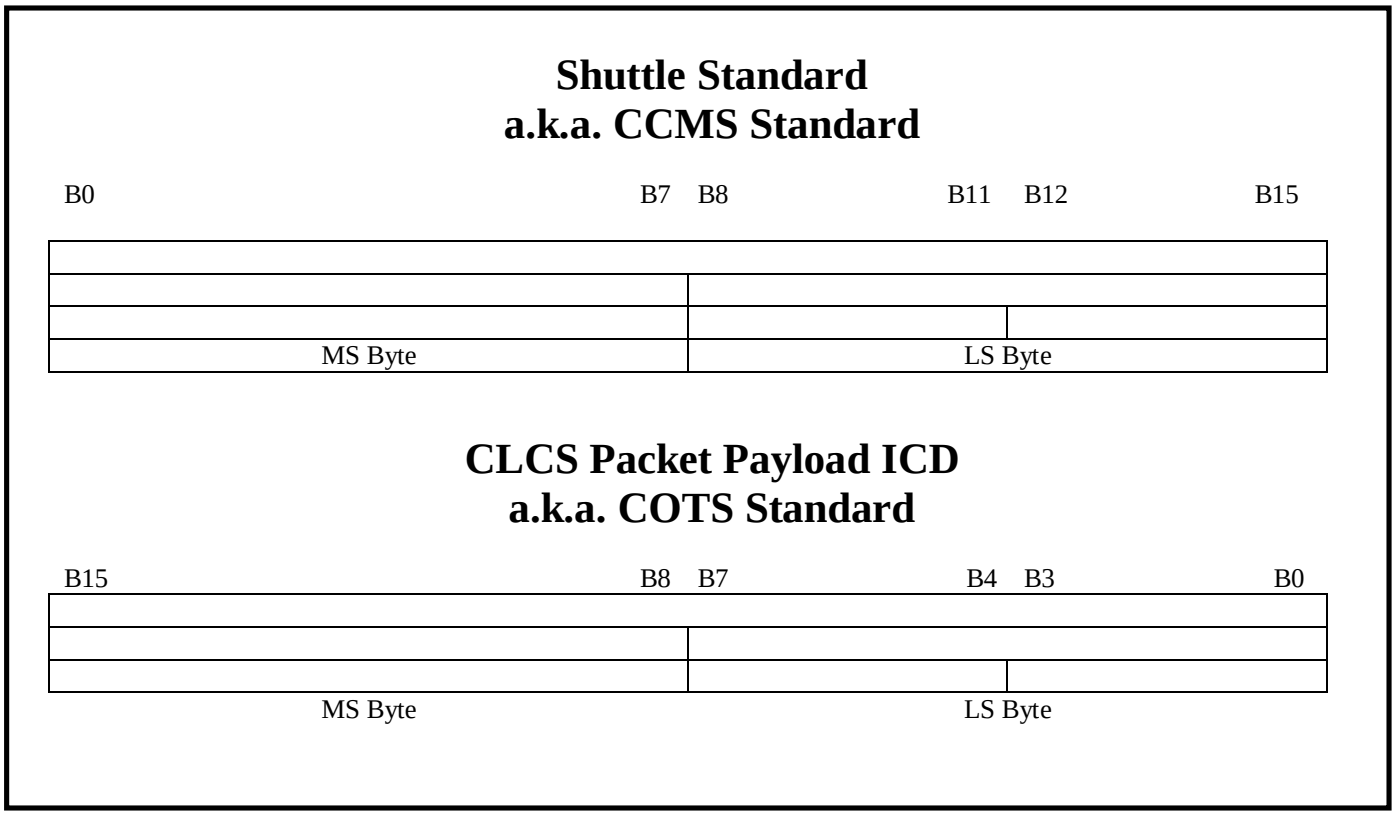


Figure 1.0

Since the time of the meeting the Packet Payload ICD has been revised, reviewed, and released a number of times with the bits labeled as shown in the CLCS Packet Payload format above. Juno and Redstone software have been released and are working using this standard.

The bit numbering in this document conforms to the COTS standard.

2. SYSTEM DATA PASSING PHILOSOPHY

2.1 INTRODUCTION

One goal of the RTPS is to provide a reliable, user-transparent means of passing data between processes and processors. The Reliable Messaging (RM) CSCI satisfies these goals. RM ensures reliability by providing fault tolerant data delivery with no undetected loss or corruption of data. RM ensures user transparency by converting user application requests to transmit data between processors into the appropriate packet payloads and passing these payloads to the RTCN or DCN.

Each packet payload consists of a header and a body. In general, the header contains such data as packet payload type, logging flags, source processor, payload length, source location, and time. The body contains the actual data that it is desired to pass between 2 or more processors or processes.

2.2 DESCRIPTION OF ACKS AND NACKS

RM generates either an ACK (acknowledgment) or NACK (negative acknowledgment) for every packet type except the System Event Notification Packet type. While it is not the intent of this document to specify the contents of the ACKs or NACKs, much of this document will drive the SDC retrieval requirements because this document defines the contents of the Packet Payload data that is recorded. ACKs for C-Cs and Responses will be recorded in CLCS. Therefore, the following data is provided as the current understanding of what the recorded ACKs and NACKs should provide:

ACK
1. Ability to derive the sending CPU
2. Ability to derive the receiving CPU
3. Ability to associate the ACK to a specific C-C or Response

NACK
1. Ability to derive the sending CPU
2. Ability to derive the receiving CPU
3. Ability to associate the NACK to a specific C-C or Response
4. NACK failure reason code

2.3 PACKET PAYLOAD TYPES

The data that are passed between processors can be categorized into several types of packet payloads. The following table lists the packet payload names and the Type Codes (Pld Type), as contained in the first byte of each header.

Table 1. Packet Payload Type Codes (In Hex)

PACKET PAYLOAD NAME	SOURCE CPU ON RTCN				SOURCE CPU ON DCN			
	GW	DDP	CCP	OPCM	DDP	CCP	HCI	OPCM
Change Data	02	22	42*	62	82		C2*	
Health and Status	**	**	**	**	**		**	**
Log Data	04	24	44	64	84	A4	C4	E4
System Event Code	05	25	45	65	85	A5	C5	E5
Computer-to-Computer Messages	01	21	41	61	81	A1	C1	E1
Computer-to-Computer Responses	00	20	40	60	80	A0	C0	E0

* = Health and status FDs to DDP

** = Deleted.-H&S will be transmitted to the DDP as part of the Change Data Packet Payload

The above packet payload type codes are based on the full hardware configuration of one or more HCI computers, one or more CCP computers, one or more DDP computers, one or more Gateways, a RTCN and a DCN. In a reduced system configuration one or more systems could be hosted on one computer. The packet payload type codes will be set as they would have been on a full hardware configuration. The assignment of a packet payload type codes will be based on the assumption that the target system is a full hardware configuration and the application software does not need to know the configuration. For example: a logical DDP and logical CCP could be located in one computer. The packet payload type values for data that is passed between the two computers would be the same as if they were located on different computers. DDP to CCP change data would be 82 no matter what the actual hardware configuration is.

The above packet payloads can further be divided into 2 types; Non C-C (Computer-to-Computer [i.e. IPC])/Response Packet Payloads and C-C/Response Packet Payloads. Following are descriptions of each type.

2.4 NON C-C/RESPONSE PACKET PAYLOADS

The Non-C-C/Response Packet Payloads consist of the first 4 packet payloads listed in the above table. That is, all packet payloads that are not C-Cs or Responses.

2.4.1 Non C-C/Response Packet Payload Headers

The Non C-C/Response Packet Payload headers are 16 bytes in length and contain the following data:

Table 2. Non C-C/Response Packet Payload Header

1 byte	1 byte	2 bytes	2 bytes	1 byte	3 bytes	6 bytes	
Pld. Type	Flags (Log)	Logical Source ID	Payload Length In Bytes	Place	Spare	MSTOD	

1. Pld Type = 1 byte = (See Table 1)
2. Flags = 1 byte = flags for logging = B6 = 1 = Log This Transaction Locally
   = B5 = 1 = Log This Transaction Temporarily
   = B4 = 1 = Log This Transaction to Archive Storage
   = B3 = 1 = One or more logging bits have been modified by a command
   = B2 = 1 = This is not the final packet of this payload
   = 0 = This is the final packet this payload
3. Logical Source = 2 bytes = The logical source CPU ID of the source of this transmission (See Table 22)
4. Payload Length in bytes = 2 bytes = length of packet payload body
5. Place = 1 byte = An identifier of the Test Set that is the source of this transmission
6. Spare = 3 bytes = reserved for future use
8. MSTOD = Either GW MSTOD of start of SSR (for GW change data packet payloads), data stream time(for all other packet payloads), or all 0's if N/A (See Para.. 2.6 and 2.7).

   NOTE: MSTOD. Includes the Julian day

Table 3. Packet Payload Header UTC Time Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
E1	Reserved						Julian Day								
Spare							11 MSB of MSTOD								
16 LSB of MSTOD															

E1 = 0 = External Time, = 1 = Internal Time

2.4.2 Non C-C/Response Packet Payload Bodies

2.4.2.1 Change Data Packet Payload Body

In general, the Change Data Packet Payload Body contains measurement/stimulus data that have changed significantly since the last time they were sampled. Each measurement/stimulus has a unique Function Designator Identifier (FDID) associated with it to distinguish it from all other Function Designators (FDs). There are 4 sources and destinations associated with Change Data packet payloads; from the Gateways to the DDP, from the DDP to the CCPs, from the CCPs to the DDP, and from the DDP to the HCI Workstations. The following is an example of the first word of a change data entry for the Gateway to the DDP.

Table 4. Example of First Word of a Change Data Entry

B15	B14 B13 B12	B11 B10 B9 B8	B7	B6	B5	B4 B3	B2 B1 B0
S	Length Following	Time	Sf	Sw	R	Entry Type	FDID

S = Spare
Length Following = In general, this value is equal to the number of words following the First Word
Time = 100 usec elapsed since last MSTOD or MS entry
Sf (Status Fail) = Gateway Status Bit 1 = FD status is known by the Gateway to be invalid
Sw (Status Warn) = Gateway Status Bit 2 = FD quality is known by the Gateway to be questionable
R = 0 = This is not a refresh entry
= 1 = This is a refresh entry
Entry Type = 0 = This is a data value entry
= 1 = This is a status entry (see Table 9)
= 2 = This is a display attribute entry (see 2.4.2.1.4 and Table 17) (DDP-HCI only)
FDID = 3 MSBs of 19-bit FDID

2.4.2.1.1 Gateway To DDP Change Data Packet Payload Body

The following data describes the Change Data Packet Payload Body which is sent at the SSR (System Synchronous Rate) from each Gateway to the DDP. The Change Data Packet Payload Body contains one of several types of data: 2-byte time entries, change data entries, status change entries (see Table 9), or refresh entries.

There are 2 bits of status in each non-time entry:

1. Bit 7 (labeled Sf [becomes Hf in DDP]) is the Gateway fail status bit and, when set, means this entry is not valid (FD processing inhibited, global processing is inhibited, a non-critical anomaly (such as loss of sync) is occurring persistently, etc). This bit being set will result in applications not processing this data as valid data.
2. Bit 6 (labeled Sw [becomes Hw in DDP]) is the Gateway warning status bit. The engineer has the capability to set or reset the Hf bit in the DDP (via Engineering) as a result of his analysis to prevent applications from processing this data. The application originating the status change (either set or reset) must include in the Status Change Entry, the reason code for the status change and must originate a descriptive system message.

The Gateway Packet Payloads described in Table 7 through Table 14, besides containing change data or refresh data, can contain what is known as a Status Change Entry. The Status Change Entry indicates that there has been a change in status for this FD. When the entry type is Status Change, no change data is contained in the entry. The first data word of the entry contains a code describing the status change, The currently identified codes and their definitions are contained in Table 5. It is the responsibility of the Gateway to reset the status bits when the error condition is corrected and to communicate this to the DDP via a Status Change Entry containing the reason. Changes do not have to be persistent to result in a Status Change Entry.

The following table describes the conditions for setting Sf and Sw, the corresponding Status Change codes for each status change condition, and whether or not persistence is required to set the status bit.

Table 5. OR Conditions for Status Bits Sf/Hf and Sw/Hw and Status Reason Code Definitions

SET Sf	SET Sw	CONDITION	PERSISTENCY TEST REQUIRED	REASON CODES
Y		FD Data Acquisition/Processing is Inhibited		#8001
Y		Global Data Acquisition/Processing is Inhibited		#8002
Y		GSE Timeout on HIM Response	Y	#8003
Y		GSE HIM Response Length Error	Y	#8004
Y		GSE HIM Response Parity Error	Y	#8005
Y		GSE HIM Response Manchester Error	Y	#8006
Y		GSE HIM Response Sync Error	Y	#8007
Y		GSE HIM Response Bypass Error		#8008
Y		GSE HIM Response Bypass Command		#8009
Y		GSE HIM Response FD Bypass Error		#800A
Y		GSE HIM Response FD Bypass Command		#800B
Y		PCM No Longer in Current Format		#8010
Y		PCM Frame Count Error	Y	#8011
Y		PCM Area Format Change		#8012
Y		ME Word Count Error	Y	#8020
Y		ME Column Parity Error	Y	#8021
Y		On-Board Dumps (that are longer than TBD)		#8030
Y		DDP CVT FD is uninitialized		#8040
	Y	Data count is out of range (range normally is 3-253 counts)		#0081
	Y	Data Not Changing at Expected Rate (Stale)		#0082
	Y	Data Conversion Error		#0083

The following tables describe each entry of the Change Data Packet Payload Entries. In general, bits 14-12 of the first word of each entry specify the number of 16-bit words that follow the first word. The lone exceptions are the MS Offset Time Entry and the Variable Length Change Data Entry. Developers must use the smallest entry below that fits the data type being sent over the RTCN.

Table 6. MS Offset Time Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	0			MS Offset From MSTOD Entry in Header											

Table 7. Variable Length Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	1			Time				Sf	Sw	R	0		Spare		
Length Following								Spare					FDID		
FDID - 16 LSB															
Data															
.															
.															
.															
.															
Data															

The above entry can be used for FDs greater than 96 bits in length.

Table 8. 16-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	2			Time				Sf	Sw	R	0		FDID		
FDID - 16 LSB															
Data															

Examples of data using above entry:
- <17-Bit Digital Pattern
- Discrete (Portrayed as 0x0000 or 0xffff)
- THDS (Time-Homogeneous Data Set) Complete

Table 9. 16-Bit Status Change Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	2			Time				Sf	Sw	R	1		FDID		
FDID - 16 LSB															
Status Reason Code (See Table 5)															

Table 10. 32-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	3			Time				Sf	Sw	R	0		FDID		
FDID - 16 LSB															
Data															
Data															

Examples of data using above entry:
- < 17-Bit Analog Converted to 32-Bit IEEE 754
- 17-32 Bit Digital Pattern
- UTC/CDT (Counts)

Table 11. 48-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	4			Time				Sf	Sw	R	0		FDID		
FDID - 16 LSB															
Data															
Data															
Data															

Example of data using above entry:
- 48-Bit Digital Pattern

Table 12. 64-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	5			Time				Sw	Sf	R	0		FDID		
FDID - 16 LSB															
Data															
Data															
Data															
Data															

Example of data using above entry:
- 64-Bit IEEE 754 FP
- GPC FP converted to IEEE 754 FP
- 64-Bit MWDP (Multi-Word Digital Pattern)

Table 13. 80-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	6			Time				Sf	Sw	R	0		FDID		
FDID - 16 LSB															
Data															
Data															
Data															
Data															
Data															

Example of data using above entry:

- Date
- When extra range is required

Table 14. 96-Bit Change Data or Refresh Entry

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	7			Time				Sf	Sw	R	0		FDID		
FDID - 16 LSB															
Data															
Data															
Data															
Data															
Data															
Data															

2.4.2.1.1.1 GSE/PCM Change Data Packet Payloads

The following two tables illustrate what the GSE and PCM Change Data Packet Payloads contain. In the GSE table, MS offset time entries appear in the data stream as MS offset time of day changes (providing data changes occur in that MS). This offset time entry is the offset from the MSTOD start of SSR (contained in the header).

In the PCM table, the MS time for the first change data entry is contained in the header MSTOD bytes. However, because an entire PCM frame is accumulated before it is change checked, change data is at least 10 MS old before it is checked and accurate time-tagging is therefore impossible. The only times that appear in the PCM table are the header time entries and the time entry at the end of the Packet Payload Body (time that processing was completed).

Table 15. GSE Change Data Packet Payload Contents (Hdr = 20 bytes)

Hdr	Time	Data	Status	Data	Time	Data	Data	Data	Time	Data	Data

NOTE: For GSE, time compression is employed.

Table 16. PCM Change Data Packet Payload Body Contents (Hdr = 20 bytes)

Hdr	Data	Data	Status	Data	Data	Data	Data	Data	Data	Data	Time

2.4.2.1.1.2 Change Data and Time Homogeneous Data Sets (THDS) Processing Description

The process for change data from the Gateway is as follows:

- The Gateway will transmit FDs as they change.
- The DDP will perform data health, and data fusion processing
- The DDP will store changes into the current value tables
- The DDP will perform the data distribution process

The process for THDS is as follows:

- When the Gateway determines that the last member of the THDS has been received it will transmit the proposed THDS Change Data Packet Payload Body Entry to the DDP
- The DDP will move the members of the THDS from the CVT into 1 of 2 toggle buffers.
- The DDP will perform data health processing for the THDS
- The DDP will store the data health of THDS in the toggle buffer, the THDS Change Data Packet Payload Body Entry, and the CVT entry for the THDS FD
- The DDP will specify that the new THDS toggle buffer is the one to use
- The DDP will perform normal data distribution to the CCP and HCI which will include the THDS Change Data Packet Payload Body Entry (with health)
- The receiving CCP and HCI will only be required to perform the copying of the THDS member's data from the CVT to the toggle buffer and specifying that the new toggle buffer is the one to use.

The above THDS process is being proposed for the following reasons:

- Minimal bandwidth on the network
- Data Path Health is the responsibility of the DDP and the health algorithm for the THDS is performed in the DDP
- Data Health for the THDS is stored by the DDP in the THDS Change Data Packet Payload Body Entry for data distribution to the CCP and HCI.

2.4.2.1.2 DDP to CCP Change Data Packet Payload Body

The DDP to CCP Change Data Packet Payload Body contains data similar to the Gateway to DDP Packet Payload Body. The header is the same.. The body contains change data entries, time entries, health entries, Fused FD entries, and Application-Derived FD entries. The payload packet is transmitted at the SSR.

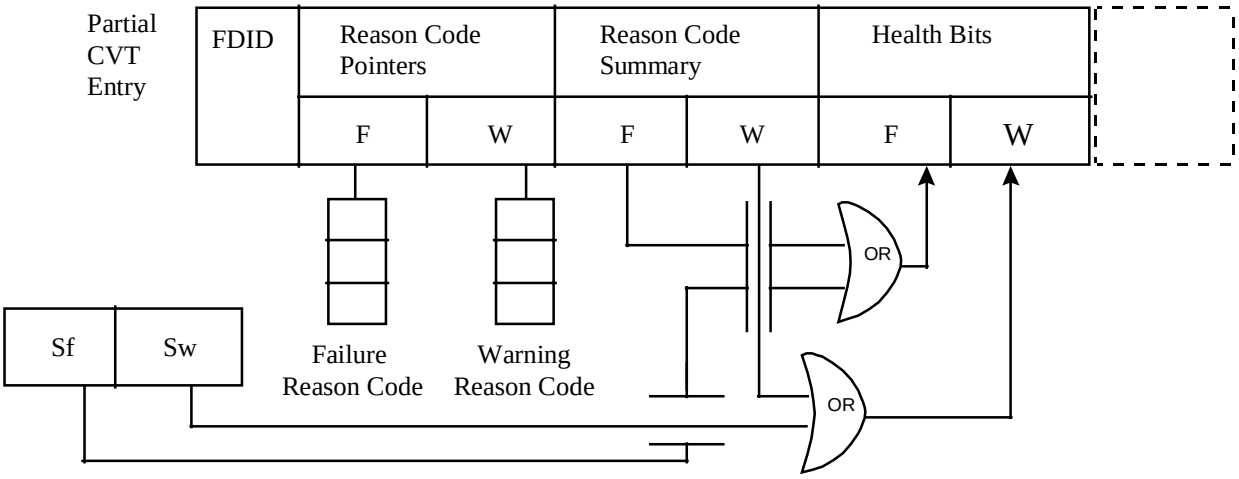
There are 2 bits of status in each change data entry received from the Gateways, Sf and Sw. When these bits are transferred by the DDP into the Current Value Table, they are transfered along with the Reason Codes and are referred to as health bits.

The health information for each FD is stored in the CVT entry. Information includes:

- Reason code (one entry for failure condition, one entry for warning)
- Reason code summary (summary = ON if one or more reason code exist, otherwise summary = OFF)
- Health Bits (one for failure condition, one for warning)

Whenever the Data Health Table is updated via the Data Health APIs or the DDP APIs, the gateway status bit for each entry is OR'ed with the corresponding reason code summary. The result of the operation is the Data Health of each FD, which will be stored into the CVT. Figure 1. below shows pictorially how these bits are set and reset.

Figure 1. Status and Health Bits



2.4.2.1.3 CCP to DDP Change Data Packet Payload Body

The CCP to DDP Change Data Packet Payload Body is identical in format to the Gateway to DDP Change Data Packet Payload Body. It also contains change data, health, and derived FDs and is transmitted at the SSR.

2.4.2.1.4 DDP to HCI Change Data Packet Payload Body

The DDP to HCI Change Data Packet Payload Body is identical in format to the DDP to CCP Change Data Packet Payload Body, with the exceptions that it is transmitted at the DSR (Display Synchronous Rate) and it can contain display attribute entries. The display attribute definitions are contained in data words 1 and 2 of the entry and are defined as follows:

Table 17. Definition of Display Attribute Entries

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
S	3			Time				Sf	Sw	2			R	FDID	
FDID - 16 LSB															
Display Attribute Class (TBD)															
Display Attribute Value (TBD)															

2.4.2.2 Health and Status Packet Payload Body

Deleted.

2.4.2.2.1 Gateway Health and Status Packet Payload Body

Deleted.

2.4.2.2.2 DDP Health and Status Packet Payload Body

Deleted.

2.4.2.2.3 CCP Health and Status Packet Payload Body

Deleted.

2.4.2.2.4 HCI Health and Status Packet Payload Body

Deleted.

2.4.2.3 Log Data Packet Payload Body

The Log Data Packet Payload Body is transmitted from each platform to the recorder as events occur that warrant recording (errors, system messages, keystrokes, etc.). The Log Data can be sent on either the RTCN or the DCN and by any platform. The detailed contents of the Log Data Packet Payload Bodies are presented in Section 4, LOG DATA PACKET PAYLOAD BODIES. The general contents of the Log Data Packet Payload Body are as follows:

Table 18. Log Data Packet Payload Body

2 Bytes	2-n bytes
LOG ID	LOG Data

2.4.2.4 System Event Code Packet Payload Body

The System Event Code (SEC) Packet Payload Bodies contain 8-byte codes that are generally used for 2 purposes: 1) for Subsystem Integrity to notify System Integrity of a Health/Status change in a local platform and 2) for System Integrity to broadcast this Health/Status change (such as platform in GO mode, switchover, HIM status change, etc.) to all communicating platforms in the set and to the Recorder. The contents of the SEC Packet Payload Body are described in the table below:

Table 19. System Event Code Packet Payload Body

2 bytes	2 bytes	2 bytes	6 bytes	2 bytes
Applic. LPORT	Applic. Ref. Des.	Orig. LPORT	System Event Code	Sequence #

NOTES: Applic. LPORT = LPORT for which this System Event Code applies (or 0, if N/A)
Applic. Ref. Des. = Ref. Des. for which this System Event Code applies (or 0, if N/A)
Orig. LPORT = The LPORT of the sender of this System Event Code
System Event Code = Byte #1 & #2 (MS bytes) = Reason Code for SEC (if applicable)
= Byte #2 #3 = Action Code for SEC (if applicable)
= Bytes #5 & #6 (LS bytes) = actual System Event Code
Sequence # = Sequence # of this SCT modification (only used when System Integrity is the Orig. LPORT, otherwise = 0)

The following table contains a list of System Event Codes used by RTPS:

Table 20. RTPS System Event Codes

SEC	Name	Source	Destination
1-255	HIM Status Change		
SEC256	Subsystem Loaded	SSI	SI (Master SCT)
SEC257	Subsystem Comm.	SSI	SI (Master SCT)
SEC258	Subsystem Go	SSI	SI (Master SCT)
SEC259	Subsystem NoGo	SSI	SI (Master SCT)
SEC260	Subsystem Not Comm.	SSI	SI (Master SCT)
SEC261	Subsystem Not Loaded	SSI	SI (Master SCT)
SEC262	Terminate	SI	SSI on trgt pltfrm
SEC263	Switchover Directive	SI	SSI on trgt pltfrm
SEC264	New Active	SI	All SSI (Local SCT)
265-328	PCM/UPLK,UCS,LDBA status change for 1 of up to 64 FDs. Bits 15-0 = System Event Code (identifies 1 to 64 FDs).		
329-392	PCM area format Id for 1 of up to 64 areas. Bits 15-0 = System Event Code (identifies 1 to 64 areas).		
SEC393	Subsystem ORT	SSI	SI (Master SCT)
SEC394	Subsystem Not ORT	SSI	SI (Master SCT)
SEC395	No Pkt rcvd frm gtwy	SI-DDP	SI-CCP
SEC396	Stdby GSE detctd no poll frm actve GSE	GSEnS	SI
SEC397	GSE rpts no rspnse frm bus	GSEnA	SI
SEC398	HC not Incremented	SI-DDP	SI-CCP
SEC399	HC has Decremented	SI-DDP	SI-CCP
SEC400.	Terminate Gracefully	SI	SSI on trgt pltfrm
SEC401	Subsystem Loaded	SI (Master SCT)	All SSI (Local SCT)
SEC402	Subsystem Comm.	SI (Master SCT)	All SSI (Local SCT)
SEC403	Subsystem Go	SI (Master SCT)	All SSI (Local SCT)
SEC404	Subsystem NoGo	SI (Master SCT)	All SSI (Local SCT)

SEC405	Subsystem Not Comm.	SI (Master SCT)	All SSI (Local SCT)
SEC406	Subsystem Not Loaded	SI (Master SCT)	All SSI (Local SCT)
SEC407	Subsystem In Config	SI (Master SCT)	All SSI (Local SCT)
SEC408	CPU Utilization	CI	SI (Master SCT)
SEC409	Available Memory	CI	SI (Master SCT)
SEC410	Disk Utilization	CI	SI (Master SCT)
SEC411	Disk Access	CI	SI (Master SCT)
SEC412	Disk Errors	CI	SI (Master SCT)
SEC413	Initial HC Received	SI-DDP	SI (Master SCT)
SEC414	Subsystem Role	SSI	SI (Master SCT)
SEC415	Subsystem Swtchovr En	SSI	SI (Master SCT)
SEC416	Subsystem Exectng On	SSI	SI (Master SCT)
SEC417	Resource IP Address	SSI	SI (Master SCT)
SEC418	Resource Ref Des	SSI	SI (Master SCT)
SEC419	Resource Physical Id	SSI	SI (Master SCT)
SEC420	Resource Host Name	SSI	SI (Master SCT)
SEC421	Resource Executing	SSI	SI (Master SCT)
SEC422	Resource Phys Name	SSI	SI (Master SCT)
SEC423	Computer Ser Num	SSI	SI (Master SCT)
SEC424	Subsystem Role	SI (Master SCT)	All SSI (Local SCT)
SEC425	Subsystem Swtchovr En	SI (Master SCT)	All SSI (Local SCT)
SEC426	Subsystem Exectng On	SI(Master SCT)	All SSI (Local SCT)
SEC427	Resource IP Address	SI (Master SCT)	All SSI (Local SCT)
SEC428	Resource Ref Des	SI (Master SCT)	All SSI (Local SCT)
SEC429	Resource Physical Id	SI (Master SCT)	All SSI (Local SCT)
SEC430	Resource Host Name	SI (Master SCT)	All SSI (Local SCT)
SEC431	Resource Executing	SI (Master SCT)	All SSI (Local SCT)
SEC432	Resource Phys Name	SI (Master SCT)	All SSI (Local SCT)
SEC433	Computer Ser Num	SI (Master SCT)	All SSI (Local SCT)
SEC434	Subsystem ORT	SI (Master SCT)	All SSI (Local SCT)
SEC435	Subsystem Not ORT	SI (Master SCT)	All SSI (Local SCT)
436-499 Avail.			
SEC500	SCT Relinquish Rqst	SI (Master SCT)	SI (Acting Master)
SEC501	SCT Relinquish Rspnse	SI (Master SCT)	SI(Acting Master)
SEC502	/SCT Relinquish Accpt	SI (Master SCT)	SI (Acting Master)
SEC503	SCT Master Request	SSI(Local SCT)	SI (Master SCT)
SEC504	SCT Master SCT Assert	SSI(Local SCT)	All SSI (Local SCT)
SEC505	SCT Master SCT Ack	SI (Master SCT)	SSI (Local SCT)
SEC506	SCT Update ReRequest	SSI(Local SCT)	SI (Master SCT)
SEC507	SCT Master Req Resp)	SI (Master SCT	SI (Acting Master)
SEC508	SCT Updt ReReq Resp	SI (Master SCT)	SI (Acting Master)
509-64K Avail.			

2.5 C-C/RESPONSE PACKET PAYLOADS

2.5.1 C-C/Response Packet Payload Headers

The C-C and C-C Response headers are each 40 bytes in length and contain the following data:

Table 21. C-C and C-C Response Headers

Bytes	C-C To Destinations	Bytes	Response From Destination
1	Payload Type (C-C type = 1)	1	Payload Type (response type = 0)
1	Flags #1	1	Flags
1	Originator Logical RSYS ID (or 0 if N/A)	1	Originator Logical RSYS ID (or 0 if N/A)
1	Originator Logical CPU ID	1	Originator Logical CPU ID
1	Source Logical RSYS ID if applicable (or 0)	1	Source Logical RSYS ID if applicable (or 0)
1	Source Logical CPU ID (Active)	1	Source Logical CPU ID (Active)
1	Destination Logical RSYS ID if applicable (or 0)	1	Destination Logical RSYS ID if applicable (or 0)
1	Destination Logical CPU ID (Active)	1	Destination Logical CPU ID (Active)
2	Number of bytes in payload	2	Number of bytes in payload
6	Time (MSTOD)	6	Time (MSTOD)
1	Place	1	Place
1	Spare	1	Spare
2	Originator Reference Designator	2	Originator Reference Designator
2	Source Reference Designator	2	Source Reference Designator
2	Destination Reference Designator	2	Destination Reference Designator
2	Originator Application ID (or 0)	2	Originator Application ID (or 0)
2	Source Application ID (or 0)	2	Source Application ID (or 0)
2	Destination Application ID (or 0)	2	Destination Application ID (or 0)
2	Transaction ID	2	Transaction ID
1	Routing Code	2	Transaction ID being responded to
1	Request ID	2	Completion Code (0=successful)
1	Flags #2	2	Spare
3	Spare	2	Response ID format
2	C-C format ID	0	
40	TOTAL BYTES	40	TOTAL BYTES

NOTE: Some C-Cs, such as a SET <FD> ON, when entered at a C&CWS, must first pass through a CCP prior to being forwarded to the final destination, a Gateway. Also the response must travel the reverse route. For these C-Cs on the DCN and on the RTCN, the Originator is the C&CWS, the Source is the CCP, and the Destination is the Gateway. For the response on the RTCN, the Originator is also the C&CWS, the Source is the Gateway, and the Destination is the CCP. For the response on the DCN, the Originator is the C&CWS, the Source is the CCP, and the destination is the C&CWS. For C-Cs that travel between only 2 nodes, such as CCP to GS1A, the Originator and the Source are the CCP, and the Destination is the Gateway. For the response, the Originator is the CCP, the Source is the Gateway, and the destination is the CCP. A pictorial view of these fields and their usages is shown in the following 2 figures.

Figure 1. Originator, Source, and Destination Definition for C-Cs/Responses Between CCWS and GW

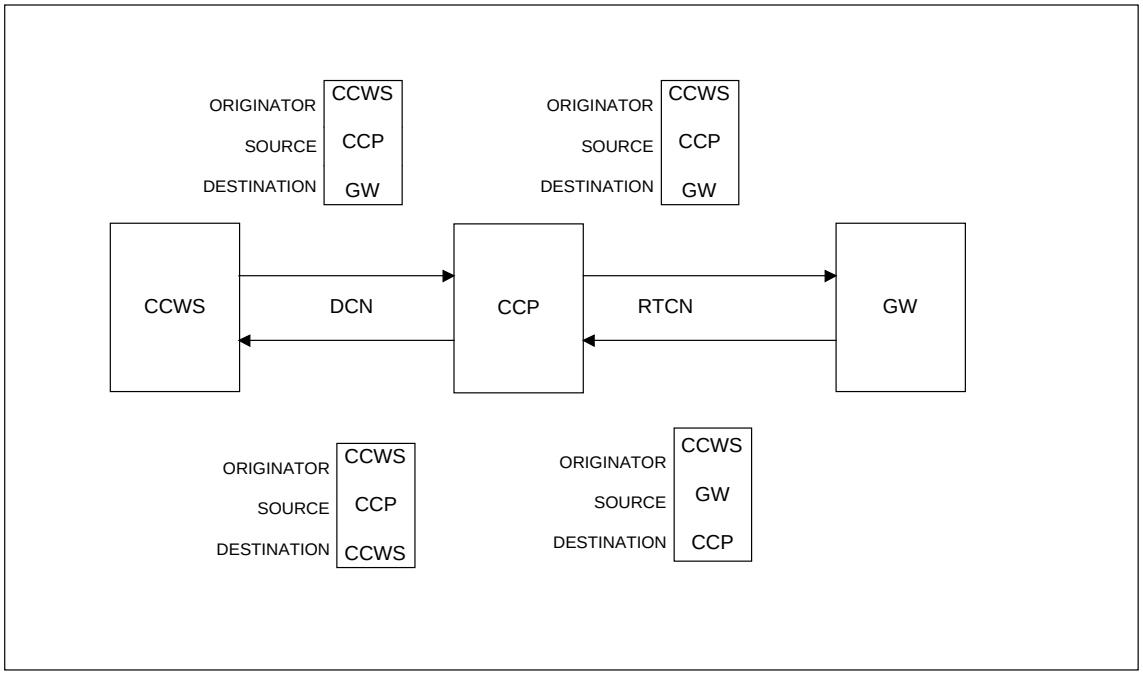
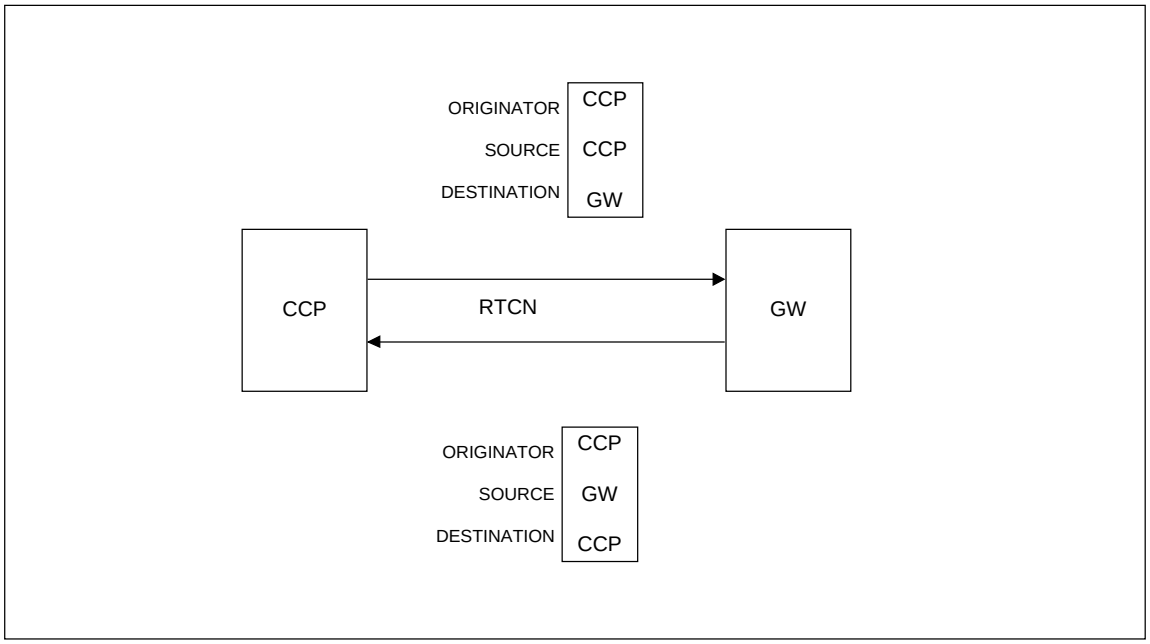


Figure 2. Originator, Source, and Destination Definition for C-Cs/Responses Between CCP and GW



Following is a description of the fields that are not obvious in Table 21:

1. Payload Type = 1 byte = 1 = C-C Packet Payload, = 0 = C-C Response Packet Payload
2. Flags #1 = 1 byte = flags = B7 = 1 = A response is expected
   = B6 = 1 = Log This Transaction Locally
   = B5 = 1 = Log This Transaction Temporarily
   = B4 = 1 = Log This Transaction to Archive Storage
   = B3 = 1 = One or more logging bits have been modified by a command
   = B2 = 1 = PCL Override is on
   = B1 = 1 = PCL is associated with this FD
   = B0 = 1 = Critical C-C
3. Flags #2 = 1 byte = B7 = 1 = PCL was run
4. Originator Logical RSYS ID = RSYS ID of originator (See Table 22)
5. Originator Logical CPU ID = CPU ID of originator (See Table 22)
6. Source Logical RSYS ID = RSYS ID of source CPU (See Table 22)
7. Source Logical CPU ID (Active) = Active CPU ID of source(See Table 22)
8. Destination Logical RSYS ID = RSYS ID of destination (See Table 22)
9. Destination Logical CPU ID (Active) = Active CPU ID of destination (See Table 22)
10. MSTOD = Either data stream MSTOD, GW MSTOD, or all 0's if N/A (includes JDAY)
11. Place = 1 byte = An identifier of the Test Set that is the source of this transmission
12. Originator Reference Designator = Reference Designator of originating CPU
13. Source Reference Designator = Reference Designator of source active CPU
14. Destination Reference Designator = Reference Designator of destination active CPU
15. Originator Application ID = ID of the application originating this C-C
16. Source Application ID = ID of the application in the source active CPU
17. Destination Application ID = ID of the application in the active destination CPU to receive this C-C
18. 19. Transaction ID = 2 bytes = a running packet payload transaction sequence number Routing Code = 1 byte = CSC to use as destination for this C-C
19. Request ID = 1 byte = Type of transaction for above routing code
20. Transaction ID being responded to = 2 byte = the C-C sequence number that is associated with this response.
21. Completion Code = 2 bytes = 0 = successful. Any response other than 0, will be a numerical value indicating the reason for failure
22. C-C/Response format ID = A unique number (to increase processing performance) assigned to each type of C-C.

Although the Logical RSYS and Logical CPU IDs have not yet been assigned, the following table provides a general idea of one way this assignment might proceed.

Table 22. Sample Firing Room Logical RSYS IDs And Logical CPU IDs For C-C Headers

LOGICAL RSYS ID	RSYS (Responsible System) NAME	LOGICAL CPU ID	CPU NAME
1	CARGO	1	GS1A
2	CPLE	2	GS1S
3	ETCO	3	GS1H
4	COMM	4	GS2A
5	NAVAID	5	GS2S
6	PLBD	6	GS2H
7	MECH	7	GS3A
8	PLINTG	8	GS3S
9	LO2	9	GS3H
10	TPROP	10	OFIA
11	SSME	11	OFIS
12	LH2	12	PCMH
13	MPS	13	ME1
14	BRS	14	ME2
15	TRS	15	ME3
16	ECLSS	16	UPLK
17	PVD	17	LDBA
18	ECS	18	LDBS
19	FCP	19	LDBD
20	FCPRSD	20	LDBH
21	GOXARM	21	CDL1
22	WATER	22	CDL2
23	ARMS	23 - 32	RESERVED
24	HYFUEL	33	CCP1
25	HYDORB	34	CCP2
26	APU	35	CCP3
27	HYD	36	CCP4
28	BHYD	37	CCP5
29	HYDSRB	38	CCP6
30	HYOXID	39	CCP7
31	HYHEGN	40	CCP8
		41 - 62	RESERVED
		63	HCI1
		.	.
		.	.
		TBD	HCIx
		TBD	RECORDER

2.5.2 C-C Response Completion Codes

Each C-C Response contains a Completion Code indicating the success or failure of the C-C. A non-zero completion code indicates a failure and the reason code for the failure.

2.5.3 C-C/Response Packet Payload Bodies

The C-C/Response Packet Payload Bodies are described in Section 3. C-C/RESPONSE PACKET PAYLOD BODIES.

2.6 PACKET PAYLOAD HEADER TIME ENTRY DEFINITION

The MSTOD time entry in the header of RTPS packet payloads can contain one of 2 different times as a function of the type and the source of the packet payload. In some cases the header MSTOD time entry will contain the time of the start of the SSR (as in the PCM and GSE Change Data Packet Payload). And, in some cases, the header MSTOD time entry will contain data stream time (as described in the following paragraph). By using 2 different times in different headers, analysis of data retrievals could reveal more data about the event that triggered the generation of the payload packet than would otherwise be possible.

2.7 DEFINITION OF DATA STREAM TIME

In order to adequately time correlate retrieved events with the activities of the subsystems at the time of the event, it is sometimes necessary for the retrieval to have access to what is referred to as data stream time, since a data stream event may be what triggered the generation of the packet payload. For this reason, it is proposed that as time-tagged data arrives at the DDP, CCP, or HCI, a running “time” variable be maintained by each subsystem. This “time” variable tracks data stream time. When a logging event occurs, the “time” variable should be immediately inserted into the packet payload header (dependent upon the payload type and source, as defined in the table below) for recording. This would allow retrievals to provide both the event’s UTC and the appropriate time for each event.. The following table specifies the contents of the header time entry for each packet payload type and source.

Table 23. Definition Of Time Entry In Packet Payload Headers

PAYLOAD TYPE	SOURCE		MSTOD OF START OF SSR	MSTOD DATA STREAM TIME
Change Data	GSE/PCM		Y	
	DDP		Y	
Health & Status	GSE/PCM			
	LDB			
	DDP			
	CCP			
	HCI			
Log Data	GSE/PCM			Y
	LDB			
	DDP			Y
	CCP			Y
	HCI			Y
System Event Code	GSE/PCM			Y
	LDB			
	DDP			Y
	CCP			Y
	HCI			Y
C-C	GSE/PCM			Y
	LDB			
	DDP			Y
	CCP			Y
	HCI			Y
C-C Response	GSE/PCM			Y
	LDB			
	DDP			Y
	CCP			Y
	HCI			Y

3. C-C/RESPONSE PACKET PAYLOAD BODIES

The following tables define the contents of the C-C and Response Packet Payload Bodies. In some cases the contents of bodies have been, and will continue to be, updated to RTPS formats with inputs from developers.

3.1 RESERVED (ROUTING CODE = 1)

3.2 REAL-TIME CONSTRAINTS AND HISTORY (ROUTING CODE = 2)

Table 24. Real Time Event Notice to EIM (Routing Code 2, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		None Expected
2	Constraint ID		
4	FDID		
6	Event Time		
4	Constraint State B16 = 1 = limit violation high B15 = 1 = limit violation low B14 = 1 = state violation B13 = 1 = equal violation B12 = 1 = not equal violation B11 = 1 = change violation B10 = 1 = delta change violation B9 = 1 = return from limit violation B8 = 1 = return from limit violation high B7 = 1 = return from limit violation low B6 = 1 = health violation B5 = 1 = return from health violation B4 = 1 = period boundary violation B3 = 1 = rtrn from period boundary violation B2 = 1 = sample boundary violation B1 = 1 = rtrn from sample boundary violation B0 = spare		
8	Value		

Table 25. Historical Constraint Information (Routing Code 2, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Number of Events		
2	Constraint ID (1 - n)		
	Constraint Owner (APID -lport, pid, process name)		
4	FDID		
6	Event Time		
4	Constraint State B16 = 1 = limit violation high B15 = 1 = limit violation low B14 = 1 = state violation B13 = 1 = equal violation B12 = 1 = not equal violation B11 = 1 = change violation B10 = 1 = delta change violation B9 = 1 = return from limit violation B8 = 1 = return from limit violation high B7 = 1 = return from limit violation low B6 = 1 = health violation B5 = 1 = return from health violation B4 = 1 = period boundary violation B3 = 1 = rtrn from period boundary violation B2 = 1 = sample boundary violation B1 = 1 = rtrn from sample boundary violation		
8	Value		
2	Violation count		
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined		
2	Expression Type Analog B12 = 1 = test lower limit B11 = 1 = test upper limit B10 = 1 = test delta change Digital Pattern B9 = 1 = test equal B8 = 1 = test not equal B7 = 1 = test delta change Discrete B6 = 1 = test state B5 = 1 = test not state General B4 = 1 = spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test return to limits		
8	Old upper limit		
8	New upper limit		

8	Old lower limit
8	New lower limit
8	Old delta change value
8	New delta change value
4	Old equal limit
4	New equal limit
4	Old not equal limit
4	New not equal limit
4	Old delta change value
4	New delta change value
2	Old state limit
2	New state limit
2	Old not state limit
2	New not state limit
2	Old period boundary value in milliseconds
2	New period boundary value in milliseconds
2	Old Sample boundary value
2	New sample boundary value

3.3 CONSTRAINT CONTROL

Table 26. Assert Analog Constraint (Routing Code 3, Reqest ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
	Constraint Owner (APID -lport, pid, process name)	2	Constraint ID
4	FDID	8	Old upper limit
2	Analog Expressions B7 = 1 = test lower limit B6 = 1 = test upper limit B5 = 1 = test delta change General B4 = 1 = spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test return to limits	8	New upper limit
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined	8	Old lower limit
8	Upper limit	8	New lower limit
8	Lower limit	8	Old delta change value
8	Delta change value	8	New delta change value
4	Period boundary value in milliseconds	4	Old period boundary value in milliseconds
2	Sample boundary value	4	New period boundary value in milliseconds
		2	Old Sample boundary value
		2	New sample boundary value

Table 27. Assert Digital Pattern Constraint (Routing Code 3, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
	Constraint Owner (APID - lport, pid, process name) -	2	Constraint ID
4	FDID	4	Old equal limit
2	Digital Pattern Expression B7 = 1 = test equal B6 = 1 = test not equal B5 = 1 = test delta change General B4 = 1 = Spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test for return to limits	4	New equal limit
2	Application Attribute	4	Old not equal limit

	B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined		
4	Equal limit	4	New not equal limit
4	Not equal limit	4	Old delta change value
4	Delta change value	4	New delta change value
2	Period boundary value in milliseconds	2	Old period boundary value in milliseconds
2	Sample boundary value	2	New period boundary value in milliseconds
		2	Old sample boundary value
		2	New sample boundary value

Table 28. Assert Discrete Constraint (Routing Code 3, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
	Constraint Owner (APID - lport, pid, process name) -	2	Constraint ID
4	FDID	2	Old state limit
2	Discrete Expression Type B6 = 1 = test state B5 = 1 = test not state General B4 = 1 = spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test return to limits	2	New state limit
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined	2	Old not state limit
2	State limit	2	New not state limit
2	Not state limit	2	Old period boundary value in milliseconds
2	Period boundary value in milliseconds	2	New period boundary value in milliseconds
2	Sample boundary value	2	Old sample boundary value
		2	New sample boundary value

Table 29. Alter Analog Constraint (Routing Code 3, Request ID 10)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Constraint ID	2	Constraint ID
	Constraint Owner (APID -lport, pid, process name)	8	Old upper limit
4	FDID	8	New upper limit
2	Analog Expressions B7 = 1 = test lower limit B6 = 1 = test upper limit B5 = 1 = test delta change General B4 = 1 = spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test return to limits	8	Old lower limit
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined	8	New lower limit
8	Upper limit	8	Old delta change value
8	Lower limit	8	New delta change value
8	Delta change value	2	Old period boundary value in milliseconds
2	Period boundary value in milliseconds	2	New period boundary value in milliseconds
2	Sample boundary value	2	Old Sample boundary value
		2	New sample boundary value

Table 30. Alter Digital Pattern Constraint (Routing Code 3, Request ID 11)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Constraint ID	2	Constraint ID
	Constraint Owner (APID - lport, pid, process name) -	4	Old equal limit
4	FDID	4	New equal limit
2	Digital Pattern Expression B7 = 1 = test equal B6 = 1 = test not equal B5 = 1 = test delta change General B4 = 1 = Spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test for return to limits	4	Old not equal limit
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined	4	New not equal limit

4	Equal limit	4	Old delta change value
4	Not equal limit	4	New delta change value
4	Delta change value	2	Old period boundary value in milliseconds
2	Period boundary value in milliseconds	2	New period boundary value in milliseconds
2	Sample boundary value	2	Old sample boundary value
		2	New sample boundary value

Table 31. Alter Discrete Constraint (Routing Code 3, Request ID 12)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Constraint ID	2	Constraint ID
	Constraint Owner (APID - lport, pid, process name) -	2	Old state limit
4	FDID	2	New state limit
2	Discrete Expression Type B6 = 1 = test state B5 = 1 = test not state General B4 = 1 = spare B3 = 1 = test health B2 = 1 = test period boundary B1 = 1 = test sample boundary B0 = 1 = test return to limits	2	Old not state limit
2	Application Attribute B7 = 1 = One shot B6 = 1 = Viewability B4 - B5 = 00 = RCL = 01 = Control B0 - B3 = User Defined	2	New not state limit
	State limit	2	Old period boundary value in milliseconds
	Not state limit	2	New period boundary value in milliseconds
2	Period boundary value in milliseconds	2	Old sample boundary value
2	Sample boundary value	2	New sample boundary value

Table 32. Release Constraint (Routing Code 3, Request ID 20)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Constraint ID	2	Constraint ID
	Constraint Owner (APID -lport, pid, process name)		
4	FDID		

3.4 SYSTEM MESSAGE WRITER (ROUTING CODE = 4)

Table 33. System Message Writer (Routing Code = 4, Request ID 1)

Bytes	C-C TO DESTINATION(S)
	Header
2	Message number
1	User Class Message Catalog
1	CSC (applicable for "common msgs only") 0 = N/A Non zero = CSC number
1	Status Code (Bad call = non-zero)
1	Number of inserts
1	Insert 1 type 0 = ASCIIZ_INSERT (null-terminated string) 1 = INTEGER_INSERT (32-bit insert param.) 2 = FLOAT_INSERT (32-bit insert param.) 3 = CDT_INSERT (32-bit insert parameter) 4 = GMT_INSERT (32-bit insert parameter) 5 = INTEGER64_INSERT (64-bit insert parameter) 6 = FLOAT64_INSERT (64-bit insert param.) 7 = MID_INSERT (32-bit parameter) 8 = FDID_INSERT (32-bit insert parameter)
n	Insert 1 - length dependent upon input type
.	.
.	.
1	Insert n type
n	Insert n

Bytes	RESPONSE FROM DESTINATION
	None defined

3.5 SYSTEM LOAD AND CONTROL (ROUTING CODE = 5)

Table 34. CM Server Configuration Status Request (Routing Code 5, Request ID 1)

Bytes	C-C TO DESTINATION(S)
	Header

Bytes	RESPONSE FROM DESTINATION
	Header
1	Init Mode 0 = SCID initialized(boot) 1 = SCID/TCID load 2 = ready 3 = Operational
30	Current SCID version (NULL terminated ASCII string)
30	Name of TCID that is loaded (or 0)
2	Nomber of TCIDs available that follow
30	Name of TCID #1
:	:
30	Name of TCID # n

Table 35. Platform to CM Server SCID Load Status (Routing Code 5, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	= 0 = Successful = 1 = Unsuccessful (POST failed)		
30	Current SCID version (NULL terminated ASCII string)		
30	Name of TCID that is loaded (or 0)		
2	Number of TCIDs available that follow		
30	Name of TCID # 1		
:	:		
30	Name of TCID # n		

Table 36. Initialize SCID or TCID (INIT xCID <CPU>) (Routing Code 5, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	Lport to Init	30	Current SCID version (NULL terminated ASCII string)
1	1 = Init SCID 2 = Init TCID	30	Name of TCID that is loaded (or 0)
30	SCID or TCID name (NULL terminated ASCII string)	2	Number of TCIDs available that follow
		30	Name of TCID # 1
		:	:
		30	Name of TCID # n

Table 37. Activate Platform Command (ACTIVATE <CPU>) (Routing Code 5, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header

Table 38. Swap CPUs (SWAP <LNAME> <LNAME>) (Routing Code 5, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	CPU 1 Lport		
2	CPU 2 Lport		

3.6 RESERVED (ROUTING CODE = 6)

3.7 GATEWAY SUBSYSTEM INIT./TERM (ROUTING CODE = 7)

Table 39. Inhibit Data Acquisition (I DA <CPU>) (Routing Code 7, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

Table 40. GSE, Activate Data Acquisition (A DA <CPU> FV L) (Routing Code 7, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Facility Verification Override 0 = Perform facility verification 1 = Inhibit facility verification		
2	Long Bus 0 = No long bus 1 = Long bus		

Table 41. PCM, Activate Data Acquisition (A DA <CPU><FID>) (Routing Code 7, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Format ID (optional)		
2	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

Table 42. LDB, Act. Data Acq. (A DA <CPU><MODE><BUS>) (Routing Code 7, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	busSelect 0 = either bus 1 = bus 1 2 = bus 2		
2	ldbMode 0 = GPC 1 = DIO		

Table 43. CSGW, Activate Data Acquisition (A DA <CPU>) (Routing Code 7, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header

Table 44. DRP, Act. Data Acq. (A DA <CPU><RTCN/DCN>) (Routing Code 7, Request ID 6)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	Network recording bit mask = 0 = Record both RTCN and DCN = 1 = Record RTCN only = 2 = Record DCN only		

Table 45. Terminate (TERM <CPU>)(Routing Code 7, Request ID 10)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header

3.8 GSE COMMAND/MEASUREMENT SYSTEM CONTROL (ROUTING CODE = 8)

Table 46. GSE Act/Inh Cmd on an FD (A/I CMD <FD>) (Routing Code 8, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	0 = Inhibit commanding 1 = Activate commanding		

Table 47. GSE Act/Inh. Global Cmd Issuance (A/I CMD <CPU>) (Routing Code 8, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Activate/Inhibit Indicator 0 = inhibit 1 = activate		

Table 48. GSE Act/Inh. Polling on a Measurement (A/I DA <FD>) (Routing Code 8, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	2	FDID
2	0 = Inhibit 1 = Activate		

Table 49. GSE A/I Polling on HIM (A/I HI <HIM #> <CPU> SCAN) (Routing Code 8, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	Options B0 = 0 = inhibit HIM = 1 = activate HIM B1 = 0 = no switch scan start = 1 = switch scan start	4	Number of 8-byte entries that follow
1	HIM address	4	Entry 1 FDID
		1	Entry 1 - HIM address
		1	Entry 1 - HIM channel (card/function code)
		1	Entry 1 - Expected value
		1	Entry 1 - Final 8-byte entry
		8	
		o	
		o	
		o	
		8	

Table 50. GSE Act/Inh. HIM Test on Msmnt (A/I HT <FD>) (Routing Code 8, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID		
2	0 = Inhibit 1 = Activate		

Table 51. GSE Act/Inh. HIM Test on HIM (A/I HT <HIM#><GSxA>) (Rtg Code 8, Req. ID 6)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	HIM address		
2	0 = Inhibit 1 = Activate		

Table 52. GSE Act/Inh HIM Test on GW (A/I HT <CPU> <SCAN/ALL>) (Rtg. Code 8, Req. ID 7)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Activate/Inhibit Indicator 0 = inhibit 1 = activate		
2	0 = HIM test 1 = Switch scan 2 = HIM test and switch scan		

Table 53. GSE Determine HIM Presence (Routing Code 8, Request ID 8)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
		1	HIM Presence Table Status 0 = built on previous request 1 = built on current request 2 = built on previous "Determine HIM Presence Request" 3 = built on current "Determine HIM Presence Request"
		32	HIM presence table

3.9 GSE MDT MAINTENANCE (ROUTING CODE = 9)

Table 54. GSE Change FD Hardware Address (C HA FD ADR) (Routing Code 9, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	New HIM address	2	Old HIM address
2	New HIM channel B7-B3 = card # B2-B0 = function code	2	Old HIM channel B7-B3 = card # B2-B0 = function code
		2	New HIM address
		2	New HIM channel B7-B3 = card # B2-B0 = function code

Table 55. GSE Change Sample Rate (C RA <FD> RATE) (Routing Code 9, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	New sample rate 0 = Return to default 1 = 100 hz 2 = 10 hz 3 = 1 hz	2	Old sample rate 1 = 100 hz 2 = 10 hz 3 = 1 hz
		2	New sample rate 1 = 100 hz 2 = 10 hz 3 = 1 hz

3.10 GSE TEI COMMANDS/MEASUREMENTS (ROUTING CODE = 10)

Table 56. GSE Apply Analog Command (APPLY <FD> VALUE) (Routing Code 10, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
4	Requested analog stimulus value (EU)	4	Requested value (FP)
2	1 = Control Logic Override is on	4	Received value (FP)
		2	Previous value (FP)
		2	Transmitted raw counts
		2	Received raw counts
		2	Previous raw counts

Table 57. GSE Set Discrete Command (SET <FD> STATE) (Routing Code 10, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	Requested state (0=0X0000, 1=0Xffff)	2	Requested state (0=0x0000, 1=0xffff)
2	1 = Control Logic Override is on	2	Received state (0=0x0000, 1=0xffff)
		2	Previous state (0=0x0000, 1=0xffff)

Table 58. GSE Issue Dig. Pattern Command (ISSU <FD> VALUE) (Routing Code 10, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	Requested pattern	2	Requested pattern
2	1 = Control Logic Override is on	2	Received pattern
		2	Previous pattern

Table 59. GSE Read Analog Output Register Command (R <FD>) (Routing Code 10, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		4	Current value (FP)
		2	Current raw counts

Table 60. GSE Read Discrete Output Register Command (R <FD>) (Routing Code 10, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	Current state (0=0x0000, 1 = 0xffff)

Table 61. GSE Read Dig. Pattern Output Register Cmd (R <FD>) (Routing Code 10, Request ID 6)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	Current pattern

3.11 PCM SYSTEM CONTROL (ROUTING CODE = 11)

Table 62. PCM Change Sync. Bits in Error (C PSB <CPU> COUNT) (Rtg. Code 11, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	Number of bits (<16)	1	Old value
		1	New value

Table 63. PCM Activate Frame Logging (A FL <CPU>) (Routing Code 11, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

Table 64. PCM Inhibit Frame Logging (I FL <CPU>) (Routing Code 11, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

Table 65. PCM Source Select (PCMS <CPU> …….) (Routing Code 11, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	PCM Parameters B15 - B13 = new source (0 = no change) B12 = change polarity(0 = no change) B11 = polarity (= 1 = minus, = 0 = plus) B6 - B10 = loop width (= 0 = no change, = 1 = 0.1%, = 2 = 0.2%, = 3 = 0.3%, = 4 = 0.4%, = 5 = 0.5%, = 6 = 0.6%, = 7 = 0.7%, = 8 = 0.8%, = 9 = 0.9%, = 10 = 1%, = 11 = 2%, = 12 = 3%) B5 = voice change (0 = no change) B4 = voice (0 = no, 1 = yes) B3 = rate change (0 = no change) B2 = rate (0 = low, 1 = high) B1 - B0 = execution option = 0000 = immediate = 0001 = pending = 0002 = cancel		
4	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

3.12 GSE/PCM/CSGW MDT MAINTENANCE (ROUTING CODE = 12)

Table 66. Activate/Inhibit Processing Single (A/I PR <FD>) (Routing Code 12, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	0 = Inhibit 1 = Activate		

Table 67. Act./Inh. Processing All (A/I PR <CPU>) (Routing Code 12, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	0 = Inhibit processing 1 = Activate processing		
2	0 = Perform immediately 1 = Perform with reset		

Table 68. Read EU Coefficients (R EUC <FD>) (Routing Code 12, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		4	A5 coefficient (FP)
		4	A4 coefficient (FP)
		4	A3 coefficient (FP)
		4	A2 coefficient (FP)
		4	A1 coefficient (FP)
		4	A0 coefficient (FP)

Table 69. Change EU Coefficients (C EUC <FD>) (Routing Code 12, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
4	A5 coefficient (FP)	4	Old A5 coefficient (FP)
4	A4 coefficient (FP)	4	Old A4 coefficient (FP)
4	A3 coefficient (FP)	4	Old A3 coefficient (FP)
4	A2 coefficient (FP)	4	Old A2 coefficient (FP)
4	A1 coefficient (FP)	4	Old A1 coefficient (FP)
4	A0 coefficient (FP)	4	OldA0 coefficient (FP)
		4	New A5 coefficient (FP)
		4	New A4 coefficient (FP)
		4	New A3 coefficient (FP)
		4	New A2 coefficient (FP)
		4	New A1 coefficient (FP)
		4	New A0 coefficient (FP)

Table 70. Act/Inh Change Processing - Single (A/I CP <FD>) (Routing Code 12, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID		
2	= 0 = Inhibit = 1 = Activate		

Table 71. Act/Inh. Change Proc.-Global (A/I CP <CPU><RESET>) (Routing Code 12, Req. ID 6)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	= 0 = Inhibit = 1 = Activate		
2	0 = Perform immediately 1 = Perform with reset		
4	Bit-mask flag for ME Gateway C-Cs = 0 = This is not an ME Gateway C-C = 1 = This C-C applies to ME1 = 2 = This C-C applies to ME2 = 4 = This C-C applies to ME3		

3.13 LDB SYSTEM CONTROL (ROUTING CODE = 13)

Table 72. LDB Act/Inh Command Single (A/I CMD <FD>) (Routing Code 13, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Spare	1	CCT pointer
2	fdAllowCmds 0 = inhibit 1 = activate		
4	FDID		

Table 73. LDB A/I Type I Cmd (A/I CMD <RID/ECP> LDBA/D) (Routing Code 13, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	Table entry number *	4	CCT pointer
2	LS number/ECP name **		
2	ECP name		
1	B7 = 1 = inhibit = 0 = activate		

* = Refer to KSC-LPS-IB-070-07 Part I, Section 0.8 (CCT Maintenance for a description of the Table Index number.

** = For a launch sequence table entry, this word must contain the index to LS table entry. For an ECP table entry, these 2 words must contain the ECP name in ASCII. For all other CCT Type I entries, these 2 words will be = 0.

Table 74. LDB Act/Inh Cmd Global (A/I CMD LDBA/D) (Rtng Code 13, Rqst ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
2	spare		
2	issueBusCmds 0 = inhibit 1 = activate		
2	gpcLdbMemoryConfig 0-6 = MC0-MC6 8-9 = MC8-MC9		
2	gpcDualMemoryConfig 0-6 = MC0-MC6 8-9 = MC8-MC9		

3.14 LDB COMMAND REQUESTS (ROUTING CODE = 14)

Table 75. LDB Issue MDM (ISSU <FD> <Value>) (Routing Code 14, Request ID 1)

Bytes	C-C TO DESTINATION(S)
	Header
2	spare
2	controlLogic 0 = Normal Command Flow 1 = Control Logic Override is on
4	FDID = FD destination for this issue. Valid Types are: DPS, DPSD (subtype 1)
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number
2	readBITE 0 = BITE not read 1 = Read BITE after issue
2	Digital pattern to issue

Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header	
2	errorCode	
2	biteWord	

Table 76. LDB G-MEM Write (GPCC LDBA/D) (Routing Code 14, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	biteWord	
2	writeCode 01 = Set designated bit(s) in memory location 10 = Reset designated bits in memory location 11 = Half-word replace (load data into memory) Type 01 and 10 above are limited to set/reset of bits in 1 word per operator			
2	contiguousFlag 0 = random write - data words will alternate (data, address, data, address, data) 1 = contiguous write - all data words will be loaded into sequential, ascending memory addresses			
2	accessFlag 1 = write protected memory 0 = write unprotected memory			
2	loadID Seven-bit code placed on G-MEM load by the ground for tracking			
2	addressMS3Bits First 3 most significant bits of 19 bit address			
2	addressLS16Bits Last 16 least significant bits of 19 bit address			
2	dataMask Set/reset mask for write codes 01 and 10 - mask bits set to zero have no action on the target.			
2	numWords Number of entries in following array			
256	addrData[128] Data words or alternating data/address word pairs for write code 11.			

Table 77. LDB EQ DEU (DEUE LDBA/D) (Routing Code 14, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	errorCode	
2	selectDEU 1 = DEU1 2 = DEU2 3 = DEU3 4 = DEU4	2	biteWord	
2	majorFunction 1 = GN&C 2 = SM 3 = PL			
2	ackDEU 1 = DEU acknowledge 0 = don't acknowledge			
2	msgResetDEU 1 = DEU msg reset 0 = don't reset			
2	numKeystrokes Number of keystrokes in following array (max of 30)			
30	keystrokes[30] The keystroke syntax must have been verified at the time the keystrokes were captured from the user			

Table 78. LDB Set MDM (SET <FD> STATE) (Routing Code 14, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	controlLogic 0 = Normal Command Flow 1 = Control Logic Override is on	2	biteWord	
4	FDID FD destination for this issue. Valid FD Types are: DS			
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response			
2	spare			
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number			
2	pulseOption 0 = no pulse delay 1 = re-execute cmd after pulseDelayTime			
2	inhibitPulseComplement 0 = The msb of the channel address is complemented prior to the second issue 1 = don't complement the channel address			
2	pulseDelayTime 6 bit delay time, 20msec/bit, 40msec granularity on GPC-MDM bus			
2	readBITE 0 = BITE not read 1 = Read BITE after issue			
2	dataWord The data for this cmd - 0x0000 or 0xffff			

Table 79. LDB Apply MDM (APPLY <FD><Value>) (Routing Code 14, Request ID 5)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	controlLogic 0 = Normal Command Flow 1 = Control Logic Override is on	2	biteWord	
4	FDID FD destination for this issue. Valid FD Types are: AS			
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response			
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number			
2	readBITE 0 = BITE not read 1 = Read BITE after issue			
2	spare1			
4	dataWord The analog data for this apply			

Table 80. LDB MDM Raw BITE Test 4 (Routing Code 14, Request ID 6)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	Spare	2	errorCode	spare
2	gpcPortNum 0 = use current GPC port 1-4 = use selected GPC port If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.	2	biteWord	numRspWords
4	FDID Note: For DPS, a btuAddress, moduleNumber, and startChannel may be optionally supplied instead of an FDID.	128		biteResponse[64]
2	btuAddress			
2	moduleNumber			
2	startChannel			
2	numChannels			

Table 81. LDB Control (GPCC LDBC) (Routing Code 14, Request ID 20)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	errorCode	
2	busSelect 0 = no change 1 = bus 1 2 = bus 2 3 = enable auto switch-over 4 = disable auto switch-over	2	biteWord	
2	gpcSelect 0 = no change 1 = GPC1 2 = GPC2 3 = GPC3 4 = GPC4 5 = GPC5 6 = Poll Off			
2	srbIOSelect 0 = no change 1 = SRB I/O on bus 1 2 = SRB I/O on bus 2 3 = disable SRB I/O			

Table 82. LDB G-MEM Read (GPCC LDBA/D) (Routing Code 14, Request ID 24)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	Spare	2	errorCode	responseType 0 = contiguous/block read response 1 = random read response
2	blockRead 0 = normal non-SACS read 1 = block read of 512 contig. half words (SACS only)	2	biteWord	wordCount Number of following data word entries for Type 0, or address/data words for Type 1.
2	accessType 0 = random (up to 64 addresses provided below) 1 = contiguous	1024		responseData[512]
2	sourceType 0 = GPC 1 = DEU1 2 = DEU2 3 = DEU3			

	4 = DEU4
2	wordCount 8 bit binary count of contiguous words to read.
2	addressMS3Bits First three MSB bits of nineteen bit starting address.
2	addressLS16Bits Last sixteen bits of nineteen bit starting address for contiguous access.
2	numRandomAddresses Count of random addresses requested in array below.
128	randomAddressLS16Bits[64] Last sixteen bits of up to 64 nineteen bit random addresses.

Table 83. LDB MDM Read (READ <FD> <# WORDS>) (Routing Code 14, Request ID 42)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	Spare	2	errorCode	Spare0
2	gpcPortNum 0 = use current GPC port 1-4 = use selected GPC port If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.	2	biteWord	rawRespWord
4	FDID Note: For DPS, a btuAddress, moduleNumber, and channelNumber. may be optionally supplied instead of an FDID.	2		Spare
2	digitalPatternShift 0 = don't shift a digital pattern for EU 1 = If the request is for an MDM digital pattern measurement with non-zero shift count, the EU converted data will be shifted so that it is right-justified.	2		dataType
2	btuAddress	4		ConvRespWord Union of possible data types
2	moduleNumber			
2	channelNumber			

Table 84. LDB CRT Text (TEXT O/G <text>) (Routing Code 14, Request ID 46)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	Bytes	NORMAL RESONSE
	Header				Header
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	errorCode	1	spare
2	displaySelect 0 = on-board 1 = ground	2	biteWord	35	message[35] Null terminated string of 34 ASCII characters max.
1	spare				
35	message[35] Null terminated string of 34 ASCII characters maximum				

Table 85. LDB MDM Master Reset (CBTU MR <MDM>) (Routing Code 14, Request ID 51)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	biteWord	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.			
2	readBITE 0 = BITE not read 1 = Read BITE after issue			
4	FDID Note: For DPS, a BTU address and module number may be optionally supplied			
2	btuAddress			
2	moduleNumber			

Table 86. LDB MDM Load BSR (CBTU LBSR <MDM>) (Routing Code 14, Request ID 52)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	biteWord	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.			
2	readBITE 0 = BITE not read 1 = Read BITE after issue			
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.			
2	btuAddress			
2	dataValue			

Table 87. LDB MDM BITE TEST 1 (CBTU BT1 <MDM>) (Rtg Code 14, Req. ID 53)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	biteWord	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.			
2	btuAddress			
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.			

Table 88. LDB MDM BITE Test 3 (CBTU BT3 <MDM>) (Routing Code 14, Request ID 54)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	
2	inhibitResponse 0 = allow orbiter response 1 = inhibit orbiter response	2	biteWord	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.			
2	btuAddress			
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.			

Table 89. LDB MDM Read BSR (CBTU RBSR <MDM>) (Rtg Code 14, Request ID 57)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.	2	errorCode	spare
2	btuAddress	2	biteWord	respWord
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.			

Table 90. LDB MDM Return Rec'd Cmd Word (CBTU WRAP <MDM>) (Rtg Code 14, Req. ID 58)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	NORMAL RESONSE
	Header		Header	
2	spare	2	errorCode	spare
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.	2	biteWord	respWord
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.			
2	btuAddress			
2	dataWord			

Table 91. LDB MDM BITE Test 2 (CBTU BT2 <MDM>) (Routing Code 14, Request ID 59)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	Bytes	NORMAL RESONSE
	Header			Header	
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number If the optional DPS addressing scheme is used, then the desired actual GPC port number as given in section 5.3.1.4 of the NASA 150 document must be given.	2	errorCode	2	numRespWords
2	btuAddress	2	biteWord	10	biteRespWords[5]
4	FDID Note: For DPS, a btuAddress may be optionally supplied instead of an FDID.				

Table 92. MDM FD BITE Test 4 (CBTU BT4 <FD>) (Routing Code 14, Request ID 60)

Bytes	C-C TO DESTINATION(S)	Bytes	TCS ERROR RESPONSE	Bytes	NORMAL RESONSE
	Header			Header	
2	spare	2	errorCode	2	Spare3
2	gpcPortNum 0 = use current GPC port number 1 - 4 = Desired GPC port number	2	biteWord	2	numRspWords
4	FDID			2	Spare1
				2	dataType1
				8	biteResponse1
				2	Spare2
				2	dataType2
				8	biteResponse2

3.15 CSGW COMMAND/MEASUREMENT SYSTEM CONTROL (ROUTING CODE = 15)

3.16 CSGW MDT MAINTENANCE (ROUTING CODE = 16)

3.17 CSGW TEI COMMANDS (ROUTING CODE = 17)

Table 93. CSGW Issue Dig. Pattern Cmnd (ISSU <FD><Value>) (Routing Code 17, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
2	Requested pattern	2	Requested pattern
2	1 = Control Logic Override is on	2	Received pattern
		2	Previous pattern

3.18 UPLK COMMAND SYSTEM CONTROL (ROUTING CODE = 18)

Table 94. UPLK A/I Cmd Type I Table (A/I <RID/ECP> UPLK) (Routing Code 18, Request ID 1)

Table 95. UPLK Act/Inh Cmd Single (A/I CMD <FD>) (Rtng Code 18, Rqst ID 2)

Table 96. UPLK Act/Inh Cmd Global (A/I CMD UPLK)

Table 97. UPLK Source Select (PCMS UPLK)

Table 98. UPLK GMEM Write (GPCC UPLK …..)

Table 99. UPLK DEU Equivalent (DEUE UPLK ….)

3.19 UPLK MDT MAINTENANCE (ROUTING CODE = 19)

3.20 UPLK TEI COMMANDS (ROUTING CODE = 20)

3.21 DRP COMMAND SYSTEM CONTROL (ROUTING CODE = 21)

Table 100. Set DRP Recording Level (SDRP <TBD>)(Routing Code 21, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	TBS		

3.22 RESERVED (ROUTING CODE = 22)

3.23 RESERVED (ROUTING CODE = 23)

3.24 RESERVED (ROUTING CODE = 24)

3.25 RESERVED (ROUTING CODE = 25)

3.26 RESERVED (ROUTING CODE = 26)

3.27 RESERVED (ROUTING CODE = 27)

3.28 RESERVED (ROUTING CODE = 28)

3.29 RESERVED (ROUTING CODE = 29)

3.30 RESERVED (ROUTING CODE = 30)

3.31 RESERVED (ROUTING CODE = 31)

3.32 RESERVED (ROUTING CODE = 32)

3.33 RESERVED (ROUTING CODE = 33)

3.34 RESERVED (ROUTING CODE = 34)

3.35 RESERVED (ROUTING CODE = 35)

3.36 RESERVED (ROUTING CODE = 36)

3.37 RESERVED (ROUTING CODE = 37)

3.38 RESERVED (ROUTING CODE = 38)

3.39 TABLE SYNCHRONIZATION (ROUTING CODE = 39)

Table 101. Synchronize CPU Tables (SYNC CPU(A)) (Routing Code 39, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	Active CPU Lport		

3.40 CHECKPOINT RESTART (ROUTING CODE = 40)

Table 102. Checkpoint Tables (Routing Code 40, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header

Table 103. Restore Checkpointed Tables (Rtg Code 40, Req. ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	= 0 = Restore most recent checkpointed tables = 1 = Restore tables received from OPS CM		

3.41 STATUS FUNCTION DESIGNATOR (ROUTING CODE = 41)

Table 104. Status LDB FD (S FD <FD>) (Routing Code 41, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	type
		2	subType
		4	Hardware bit mask
		2	shiftCount
		2	busSelect
		2	BTU_Class
		2	GPC_Port1Primary
		2	GPC_Port2
		2	GPC_Port3
		2	GPC_Port4
		2	GPC_Port1Secondary
		2	EIU_Number
		2	mode
		2	PCM_PDI_BTU_address1
		2	PCM_PDI_BTU_address2
		2	opcode
		2	moduleAddress1
		2	moduleAddress2
		2	channelAddress1
		2	channelAddress2
		2	wordCount
		2	serialIOWordNum
		2	mask
		2	discreteSet1
		2	discreteSet2
		2	discreteReset1
		2	discreteReset2
		2	GPC_CriticalCommandInd
		2	multiPortInd
		2	activateInhibitFD
		2	activateInhibitFDDefault
		4	A0ScalingFactor
		4	A1ScalingFactor
		4	A2ScalingFactor
		4	A3ScalingFactor
		4	A4ScalingFactor
		4	A5ScalingFactor
		11	FD[11]
		1	spareByte1
		35	nomenclature[35]
		1	spareByte2
		2	spareWord1
		2	numRspWords
		2	rawRspWord1
		2	rawRspWord2

2	spare3
2	dataType1
8	convRspWord1 union of possible data types
2	spare4
2	dataType2
8	convRspWord2 union of possible data types

Table 105. Status Analog FD (S FD <FD>) (Routing Code 41, Request ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	Sample rate - samples per major frame
		2	Subframe or HIM address/card/channel
		2	Minor frame
		2	Channel
		2	Type
		2	Subtype
		8	Hardware bit mask
		8	CLCS bit mask
		2	Measurement Status Word B15 = Measurement Processing Single 0 = disabled 1 = enabled B14 = GW Measurement Processing 0 = disabled 1 = enabled B13 = GW Data Acquisition 0 = disabled 1 = enabled B12 = 0 = Q - IV RTU (UCS only) = 1 = QSS 4 RTU (UCS only) B11 = 0 = not fire alarm data (UCS only) = 1 = fire alarm data (UCS only) B10 = Sf (Status Fail) 0 = valid data 1 = invalid data B9 = Sw (Status Warn) 0 = valid data 1 = questionable data B8 = Significant Change Checking 0 = disabled 1 = enabled B7-B4 = Spare B3 = Measurement Acquisition 0 = disabled 1 = enabled B2 = Spare B1 = HIM Testing 0 = disabled 1 = enabled B0 = HIM Measurement Testing 0 = disabled 1 = enabled
		8	Processed data value (right justified)
		8	Analog raw data (right justified)
		4	EU Coefficient A5
		4	EU Coefficient A4
		4	EU Coefficient A3
		4	EU Coefficient A2
		4	EU Coefficient A1
		4	EU Coefficient A0

2	MDT Index

Table 106. Status Discrete FD (S FD <FD>) (Routing Code 41, Request ID 3)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	Sample rate - samples per major frame
		2	Subframe or HIM address/card/channel
		2	Minor frame
		2	Channel
		2	Type
		2	Subtype
		8	Hardware bit mask
		8	CLCS bit mask
		2	Measurement Status Word B15 = Measurement Processing Single 0 = disabled 1 = enabled B14 = GW Measurement Processing 0 = disabled 1 = enabled B13 = GW Data Acquisition 0 = disabled 1 = enabled B12 = 0 = Q - IV RTU (UCS only) = 1 = QSS 4 RTU (UCS only) B11 = 0 = not fire alarm data (UCS only) = 1 = fire alarm data (UCS only) B10 = Sf (Status Fail) 0 = valid data 1 = invalid data B9 = Sw (Status Warn) 0 = valid data 1 = questionable data B8 = Significant Change Checking 0 = disabled 1 = enabled B7-B4 = Spare B3 = Measurement Acquisition 0 = disabled 1 = enabled B2 = Spare B1 = HIM Testing 0 = disabled 1 = enabled B0 = HIM Measurement Testing 0 = disabled 1 = enabled
		2	Current state
		2	MDT Index

Table 107. Status Digital Pattern FD (S FD <FD>) (Routing Code 41, Request ID 4)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
4	FDID	4	FDID
		2	Sample rate - samples per major frame
		2	Subframe or HIM address/card/channel
		2	Minor frame (PCM only)
		2	Channel number (PCM only)
		2	Type
		2	Subtype
		8	Hardware bit mask
		8	CLCS bit mask
		2	Measurement Status Word B15 = Measurement Processing Single 0 = disabled 1 = enabled B14 = GW Measurement Processing 0 = disabled 1 = enabled B13 = GW Data Acquisition 0 = disabled 1 = enabled B12 = 0 = Q - IV RTU (UCS only) = 1 = QSS 4 RTU (UCS only) B11 = 0 = not fire alarm data (UCS only) = 1 = fire alarm data (UCS only) B10 = Sf (Status Fail) 0 = valid data 1 = invalid data B9 = Sw (Status Warn) 0 = valid data 1 = questionable data B8 = Significant Change Checking 0 = disabled 1 = enabled B7-B4 = Spare B3 = Measurement Acquisition 0 = disabled 1 = enabled B2 = Spare B1 = HIM Testing 0 = disabled 1 = enabled B0 = HIM Measurement Testing 0 = disabled 1 = enabled
		8	Current value (right justified)
		2	MDT Index

3.42 CORBA TRANSACTION (ROUTING CODE = 42)

Table 108. CORBA Transaction (Routing Code 42, Request ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header (If Response is expected)
4-n	CORBA payload		

3.43 MODIFY PSEUDO AND DATA HEALTH/DISPLAY ATTRIBUTES (RTG CODE = 43)

Table 109. Change Data Health by FDs (C DHFD <FDs> F/W Source RC)* (Rtng Code 43, Req. ID 1)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	warn/failure B0 = 1 = warning B1 = 1 = failure B2 - B7 = spare		
1	Health source		
2	Number entries number of 4 byte FDID entries that follow		
2	Status reason code		
4	FDID 1		
:	:		
4	FDID n		

* = Source = ENGINEER except for O&M, who can set health for any source (e.g. Advisory, Gateway, etc). FD authentication is performed before data health can be changed.

Table 110. Change Data Health by List (C DHL <listname> F/W Srce RC)* (Rtg Code 43, Req. ID 2)

Bytes	C-C TO DESTINATION(S)	Bytes	RESPONSE FROM DESTINATION
	Header		Header
1	warn/failure B0 = 1 = warning B1 = 1 = failure B2 - B7 = spare		
1	Health source		
2	Status reason code		
4	Group id		

* = Source (Srce) = ENGINEER except for O&M, who can set health for any source (e.g. Advisory, Gateway, etc). FD authentication is performed before data health can be changed.

Table 111. Change Display Attributes (C DA <FD> Class Value) (Routing Code 43, Request ID 3)

	Header		Header
4	FDID		
1	Display attribute class		
1	Display attribute value		

Table 112. Apply Pseudo Analog (CDTH or APPL <FD> Value) (Routing Code 43, Request ID 4)

	Header		Header
4	FDID		
4	Analog stimulus value		

Table 113. Set Pseudo Discrete (SET <FD> STATE) (Routing Code 43, Request ID 5)

	Header		Header
4	FDID		
4	Discrete stimulus value		

Table 114. Issue Pseudo Dig. Pattern (ISSU <FD> Pattern) (Routing Code 43, Request ID 6)

	Header		Header
4	FDID		
4	Digital pattern value		

3.44 RESPONSE TO GATEWAY COMMAND (FROM GATEWAY) (ROUTING CODE = 44)

4. LOG DATA FORMATS

The following paragraphs and tables contain the formats of the Log Data Packet Payloads (which are the equivalent of the CCMS-I BFL (Block Funnel Log) data. This Section Is organized alphabetically by the 2 character Log ID.

The data in this document has in many cases not been finalized. Work on this document will continue throughout the program. In many cases where the body contents have not been defined, it is the responsibility of development personnel to provide the design.

Table 115. AC (Application Control) Log Data Format

NOTE: It is not known at this time whether the AC log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 116. AM (Application Message) Log Data Format

NOTE: It is not known at this time whether the AM log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 117. CI (C&D Interface Processor) Log Data Format

NOTE: It is not known at this time whether the CI log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 118. CP (C&D Display Page Processor Prompts) Log Data Format

NOTE: It is not known at this time whether the CP log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 119. CS (C&D Display Page Processor Skeleton Assignment) Log Data Format

NOTE: It is not known at this time whether the CS log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 120. DE (Device Error) Log Data Format

B31	B0
DE (Log ID)	The remainder of the Device Error Log format must be defined by the developers as the system matures. Below is a sample of the contents of the Device Error Log for CCMS-I

Table 121. DP (ORT Test Error Log) Log Data Format

B31	B0
DP (Log ID)	The remainder of the ORT Test Error Log format must be defined by the developers as the system matures. Below is a sample of the contents of the ORT Test Error Log for CCMS-I

Table 122. FA (LDB GPC DEU Dump Response Data Received) Log Data Format *

B31	B0
FA (Log ID)	C-C Transaction ID
C-C Logical Source Responsible System ID	C-C Logical Source CPU ID
Spare	
Transaction Time Stamp Seconds	
Transaction Time Stamp Nanoseconds	
Spare	Transmit Word Count
Transmitted Data Word 1	Transmitted Data Word 2
Up to 518 Remaining Words of Transmitted Data	

* = (Reference SS-P-0002-150,0ft Launch Data Bus Software Interface Requirements, For Details)

Table 123. FB (Block II ME Memory Dump Via PCM) Log Data Format

B31		B0
FB (Log ID)	Dump Address	
Sync MSBs (0xFAF3)	Sync LSBs (0x20)	Byte Cnt/2 of Dump Data
256 Bytes of ME Dump Data		
EIU BITE Status Word	Column Parity	

* = Frames of Block II Main Engine Memory Dump Data are logged under This ID.

Table 124. FC (UPLINK Common Tracking Mode Uplink Frame) Log Data Format

B31		B0
FC (Log ID)		Request ID
. Function Designator		Identifier (FDID) .
		Success/Fail Indicator *
Sequence #	Total # In Sequence	Sync Word MSBs (0xFAF3)
Sync Word LSBs (0x20)	Station ID	Spare
16 Bytes of BCH Encoded Command Data As Defined In CPDS 140		

* = Success/Fail Indicator (0 = Success, Otherwise Error ISW)

Table 125. FD (LDB DIO Mode Data Transmitted)

B31		B0
FD (Log ID)	Lport Of Requesting CPU	Request ID
. Function Designator	Identifier	.
	Success/Fail Indicator *	
C-C Transaction Serial Number	Number of 16-Bit Cmd Data Words (CDW) If Issue	
No. of 16-Bit Response Data Words (RDW) If Read or Pulse Delay Time (in 20 ms Ticks) If Issue and If Pulse Output Option	Hardware Address (Bit 15 Not Used) Bits 14 - 11 = MDM Card (Module) Number Bits 10 -6 = MDM Channel Number Bits 5 - 0 = MDM BTU Address	
Hardware Address (Bits 18 - 16 and 26 - 24)Not Used) Bits 23 - 19 = Mode Control Bits 31 - 27 = Binary Count of CDWs or RDWs		
Up to 15 16-Bit CDWs if this is an Issue		
. Extra FDIDs For Multiple Issue.	(<=15 For Multiple Analog)	

* = Success/Fail Indicator (0 = Success, Otherwise Error ISW)

Table 126. FE (LDB Gateway Error Status Data) Log Data Format *

B31	B0
FE (Log ID)	Bus Interface Configuration
Bus Interface Error Word	Bus Error Status Word
GPC Error Status Word	Calculated Data Check Sum
Bus Interface Previous State	Bus Interface Current State
Level A Command	
Level A Response	
Level A-B Transaction Time Stamp Seconds	
Level A-B Transaction Time Stamp Nanoseconds	
Level C command	
Level C-D Transaction Time Stamp Seconds	
Level C-D Transaction Time Stamp Nanoseconds	
Level E/F Command	
Level F Response	
Level E-F Transaction Time Stamp Seconds	
Level E-F Transaction Time Stamp Nanoseconds	
Expected Level D Transmit/Receive Data Word Count	Actual Level D Transmit/Receive Data Word Count
Transmitted/Received Level D Data Word 1	
Up to 519 Remaining Words of Level D Transmitted/Received Data	

* = FE Log Data is sent to recorder by LDB Gateway when an anomaly is encountered.

DEFINITION OF FE LOG DATA WORDS

FE Word 1 - Log ID = FE

FE Word 2 - Bus Interface Configuration:
Bit 0 = Bus 1 enabled (0=disabled, 1=enabled)
Bit 1 = Bus 2 enabled (0=disabled, 1=enabled)
Bit 2 = spare
Bit 3 = spare
Bit 4 = RX enabled (0=GPC waved off, 1=enabled)
Bit 5 = TX enabled (0=standby, 1=active)

FE Word 3 - Bus Interface Error Word
Bit 0 = Interrupt error
Bit 1 = Interrupt timeout
Bit 2 = spare
Bit 3 = Interrupt(s) missed
Bit 4 = Interrupt queue error
Bit 5 = Command queue error
Bit 6 = Response queue error
Bit 7 = Interrupt queue entry error
Bit 8 = Interrupt queue/data buffer mismatch
Bit 9 = Data buffer error
Bit 10 = Wrong state after RX error
Bit 11 = Wrong state with RX pending
Bit 12 = Wrong state after TX error
Bit 13 = Wrong state with TX pending
Bit 14 = Wrong state after Interrogate error
Bit 15 = Wrong state with Interrogate pending

FE Word 4 - Bus Error Word
Bit 0 = Too few bits

Bit 1 = Too many bits
Bit 2 = Manchester error
Bit 3 = Parity error
Bit 4 = Sync error
Bit 5 = Word count error
Bit 6 = Address error
Bit 7 = Wrong bus
Bit 8 = Poll cycle protocol error
Bit 9 = Checksum error
Bit 10 = SEV error (not=101)
Bit 11 = spare
Bit 12 = Invalid GPC Bus Switch
Bit 13 = Data word error
Bit 14 = Command word error
Bit 15 = Response timeout detected on active

FE Word 5 - GPC Status Word
Bit 0 = spare
Bit 1 = spare
Bit 2 = spare
Bit 3 = Illegal response code
Bit 4 = spare
Bit 5 = Checksum error
Bit 6 = Duplicate transaction ID
Bit 7 = Standby
Bit 8 = Function destination cannot accept data
Bit 9 = Invalid data request
Bit 10 = Resolving TCS linkage
Bit 11 = Hardware detected I/O error
Bit 12 = spare
Bit 13 = spare
Bit 14 = spare
Bit 15 = spare

FE Word 6 - Calculated Checksum for Level D Received Data

FE Word 7 - Bus Interface Previous State:
0 = Waiting for Interrogate command
1 = Waiting for Go-Ahead command
2 = Waiting for Here Comes Data command
3 = Waiting for Status command
4 = Waiting for Status Request command
5 = Invalid state

FE Word 8 - Bus Interface Current State:
0 = Waiting for Interrogate command
1 = Waiting for Go-Ahead command
2 = Waiting for Here Comes Data command
3 = Waiting for Status command
4 = Waiting for Status Request command
5 = Invalid state

FE Word 9-10 - Level A Command

FE Word 11-12 - Level B Response

FE Word 13-14 - Level A-B Transaction Time Stamp Seconds

FE Word 15-16 - Level A-B Transaction Time Stamp Nanoseconds (Resolution is 500 nanoseconds)

FE Word 17-18 - Level C Command

FE Word 19-20 - Level C-D Transaction Time Stamp Seconds

FE Word 21-22 - Level C-D Transaction Time Stamp Nanoseconds (Resolution is 500 nanoseconds)

FE Word 23-24 - Level E/F Command

FE Word 25-26 - Level F Response

FE Word 27-28 - Level E-F Transaction Time Stamp Seconds

FE Word 29-30 - Level E-F Transaction Time Stamp Nanoseconds (Resolution is 500 nanoseconds)

FE Word 31 - Expected Level D Transmitted/Received Data Word Count

FE Word 32 - Actual Level D Transmitted/Received Data Word Count

FE Word 33-552 - Up to 520 Level D Transmitted/Received Data Words

Table 127. FF (LDB Safing Data Transmitted) Log Data Format *

B31 B0

FF (Log ID)		Lport Of Requesting CPU	Request ID
. Function Designator		Identifier	.
		Success/Fail Indicator *	
Cmd No. Within Sequence	Sequence Number	Byte Count of CDW Bytes to be Sent to GPC	
Command Data Word #1 Generated by LDB GW **		Command Data Word #n Generated by LDB GW **	

* = Success/Fail Indicator (0 = Success, Otherwise Error ISW)
** = Command Data Generated By LDB GW (Reference SS-P-0002-150, OFT Launch Data Bus Interface Requirements, For Details)

Table 128. FG (LDB GPC Mode Data Transmitted) Log Data Format *

B31 B0

FG (Log ID)	C-C Transaction ID
C-C Logical Source Responsible System ID	C-C Logical Source CPU ID
FDID (0 = Not Applicable)	
Transaction Time Stamp Seconds	
Transaction Time Stamp Nanoseconds	
Spare	Transmit Word Count
Transmitted Data Word 1	Transmitted Data Word 2
Up to 518 Remaining Words of Transmitted Data	

* = (Reference SS-P-0002-150,0ft Launch Data Bus Software Interface Requirements, For Details)

Table 129. FH (UPLINK 72 or 32 kbs Hardline Mode Uplink Frame) Log Data Format

B31 B0

FH (Log ID)		Lport Of Requesting CPU	Request ID
. Function Designator		Identifier	.
		Success/Fail Indicator *	
Sequence #	Total # In Sequence		
. 48-Bit Command As		Defined In CPDS 140	.
Sync Word MSB (0xFAF3)		Sync Word LSB (0x20)	Station ID
1st x Words (y Bytes) Of Voice = Alternate "1-0" Bit Pattern			
1st 2 Words (4 Bytes) Of BCH Encoded Command Data As Defined In CPDS 140			
2nd x Words (y Bytes) Of Voice = Alternate "1-0" Bit Pattern			
2nd 2 Words (4 Bytes) Of BCH Encoded Command Data As Defined In CPDS 140			
3rd x Words (y Bytes) Of Voice = Alternate "1-0" Bit Pattern			
3rd 2 Words (4 Bytes) Of BCH Encoded Command Data As Defined In CPDS 140			
4th x Words (y Bytes) Of Voice = Alternate "1-0" Bit Pattern			
4th 2 Words (4 Bytes) Of BCH Encoded Command Data As Defined In CPDS 140			
5th x Words (y Bytes) Of Voice = Alternate "1-0" Bit Pattern			

For 32 kbps mode above, x=6, y=12
For 72 kbps mode above, x=16, y=32
* = Success/Fail Indicator (0 = Success, Otherwise Error ISW)

Table 130. FI (Block Log ME Dump Frames) Log Data Format

B31 B0

FI (Log ID)	Command Word	
Sync Pattern (MSB)	Sync Pattern (LSB)	Byte Cnt/2 of Dump Data
256 Bytes of ME Dump Data		
EIU Bite Status	Column Parity	

Table 131. FJ (CPI Uplink Frame) Log Data Format

B31 B0

FJ (Log ID)	Error Indication Word *
Fifth - Tenth Bytes = Uplink Command Word (0 If Sync Error)	
	Byte Count of Data Following
Next 80 Bytes = 40-Word Frame Rcvd If Low Mode	Next 600 Bytes = 300-Word Frame Rcvd if NASCOM

* = Error Indication Word
Bit 1 = 1 = Station ID Error
Bit 2 = 1 = BCH Decode Error
Bit 3 = 1 = Sync Error

Note: In NASCOM Mode Only The First Of The 33 Possible Uplink Command Words Is Logged. The Remaining Command Word Data Can Be Found In Words 13 Through 75 Of The Raw Frame.

Table 132. FK (CITE Uplink NSP Command Buffer Format) Log Data Format

B31 B0

FK (Log ID)	Lport Of Requesting CPU	Request ID
FEP Completion Code	NSP Status Word *	
First 48-Bit Command/Idle Frame Entry		.
Second 48-Bit Command/Idle Frame Entry		
3rd - 9th 48-Bit Command/Idle Frame Entry		.
Tenth 48-Bit Command/Idle Frame Entry		.
NSP Validity Word **	Spare	

* = NSP Status Word
Bit 15 = Data Ready (1 = Cmd Buffer., 0 = Idle Buffer.)
Bit 14 = Data Valid (1 = Inhibit, 0 = Data Valid)
** = NSP Validity Word
Bits 15-6 = First 10 Bits Correspond To The 10 48-Bit Cmd/Idle Frame Entries
= 1 = Corresponding Entry Is A Command
= 0 = Corresponding Entry Is Fill Data

Table 133. FL (Block II ME FDR Dump Via PCM) Log Data Format

B31 B0

FL (Log ID) *	Command Word	
Sync Pattern (MSB)	Sync Pattern (LSB)	Byte Cnt/2 of Dump Data
256 Bytes of ME Dump Data		
EIU Bite Status	Column Parity	

* = Frames of Block II Main Engine FDR dump data are logged under this ID.

Table 134. FM (LDB Mass Memory Dump Response Data) Log Data Format

B31 B0

FM (Log ID)	Spare
Spare	Byte_Count/2 of Bytes Received from GPC
Response Data from GPC *	

* = For Details, Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements: (A) Mass Memory Read Sequence Response (B) Mass Memory Read/Write Patch (Capability 2)

Table 135. FN (LDB ECP Error Response Data) Log Data Format

B31 B0

FN (Log ID)	Lport Requesting ECP	Spare
Spare	Byte_Count/2 of Bytes Received from GPC	
Response Data from GPC		

* = For Details, Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, TCS Error Response format for details.

Table 136. FP (LDB PCMMU/PDI Dump Response Data) Log Data Format

B31 B0

FP (Log ID)	PCMMU/PDI Command H/W Address 1 *
PCMMU/PDI Command H/W Address 2 **	Byte_Count/2 of Bytes Received from GPC
Spare	
Response Data from GPC ***	

* = PCMMU/PDI Command Hardware Address 1
Bits 15-13 Spare
Bits 12-8 GPC Port Assignment
Bits 7-5 PCMMU Or PDI Address
Bits 4-1 Opcode
Bit 15 MSB Starting Address (PCMMU) or LSB Opcode (PDI)
** = PCMMU/PDI Command Hardware Address 2
Bits 31-21 11 LSB Starting Address (PCMMU) or Starting Address (PDI)
Bits 20-16 Count of Words Read
*** = For Details, Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, TCS Operator Code 8 for details.

Table 137. FR (LDB GPC Mode Unsolicited Response Data Received) Log Data Format *

B31 B0

FR (Log ID)	Spare
Spare	Spare
Spare	
Transaction Time Stamp Seconds	
Transaction Time Stamp Nanoseconds	
Spare	Received Word Count
GPC Response Data Word 1	GPC Response Data Word 2
Up to 518 Remaining Words of GPC Response Data	

* = (Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, For Details)

Table 138. FS (TCS-S or TCS-1 Call Response Data Received) Log Data Format

B31 B0

FS(Log ID)	Byte_Count/2 of Bytes Received from GPC
Unsolicited Response Data from GPC *	

* = Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, For Details

Table 139. FT (PCM Telemetry Error Frame Dump) Log Data Format

B31 B0

FT(Log ID)	Byte_Count/2 of Bytes Received from PCM
Words of PCM Frame Data *	

* = Frames Of PCM Telemetry Data Are Logged If They Contain Errors Such As Sync Errors, Frame Count Errors, Or Format ID Errors. Also They Are Logged If The PCM Frame Logging Process Is Active.

Table 140. FU (ME Telemetry Error Frame Dump) Log Data Format

B31 B0

FV (Log ID)	Spare	
Sync Pattern (MSB)	Sync Pattern (LSB)	Byte Cnt/2 of VDT
256 Bytes of ME Dump Data *		
EIU Bite Status	Column Parity	

* = Frames Of Main Engine PCM Data Are Logged Under This ID Whenever One Of The Following Validity Checks Fail:
- Column Parity
- EIU Bite Status
- Repeat Frame Check
- Word Count - Controller ID Words
- Controller Time Reference Word

Table 141. FX (GPC Main Memory/Mass Memory Dump via Downlist) Log Data Format

B31 B0

FX (Log ID) *	Gateway Flag Word **
Gateway Calculated Checksum	Byte_Count/2 of Dump Data Received from PCM
GPC Dump Data ***	

* = GPC Main Memory And Mass Memory Dumps Via The GPC Downlist Are Logged Under ID "FX".
** = Gateway Flag Word
Bits 15 - 4 = Spare
Bit 3 = Data Cycle Indicator (0 = Frame 0 or 25)
Bit 2 = Checksum Error Ind. (0 = Checksum Error)
Bit 1 = Word count Error Ind. (0 = Word count Error)
Bit 0 = Checksum Dump Ind. (0 = Onboard Checksum Expected)
*** = GPC Dump Data (See SS-P-0002-140T For Layout Of Dump Data)

Table 142. FY (ME Telemetry Frame) Log Data Format

B31 B0

FY(Log ID)	Spare	
Sync Pattern (MSB)	Sync Pattern (LSB)	Word count of VDT
Bytes 1 - 256 of ME Dump Data *		
EIU Bite Status	Column Parity	

* = This ID Is Used To Log The First Good Frame Of SSME Data Following A Frame With Errors. The Format Is The Same As Log ID "FU".

Table 143. F1 (LDB SSME Load Program Response Data) Log Data Format

B31 B0

F1(Log ID)	Spare
Response Data Generated By GPC (12 Bytes of Log Data) *	

GPC SSME Load Program (SLP) Response Data Is Logged For Requests Originating From TAS And OCF.
* = Response Data Generated By GPC (Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, For Details)

Table 144. F2 (LDB GPC Mode Other Solicited Response Data Received) Log Data Format *

B31 B0

F2 (Log ID)	C-C Transaction ID
C-C Logical Source Responsible System ID	C-C Logical Source CPU ID
FDID (0 = Not Applicable)	
Transaction Time Stamp Seconds	
Transaction Time Stamp Nanoseconds	
Spare	Received word count
GPC Response Data Word 1	GPC Response Data Word 2
Up to 518 remaining words of GPC response data	

* = (Reference SS-P-0002-150, OFT Launch Data Bus Software Interface Requirements, For Details)

Table 32. IN (Init Completion Messages) Log Data Format

NOTE: It is not known at this time whether the IN log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 145. PI (PFP Function Key Inputs) Log Data Format

NOTE: It is not known at this time whether the AC log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 146. PT (UCS RTU Timeout/Fire Alarm Printer Messages) Log Data Format

NOTE: It is not known at this time whether the PT log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 147. RC (Recovery Dump) Log Data Format

NOTE: It is not known at this time whether the RC log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 148. SM (System Message Writer Request) Log Data Format

NOTE: It is not known at this time whether the SM log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.

Table 149. SP (Spa Spooler) Log Data Format

NOTE: It is not known at this time whether the SP log ID has an equivalent in RTPS. If it does, the format must be defined by the developers as the system matures.